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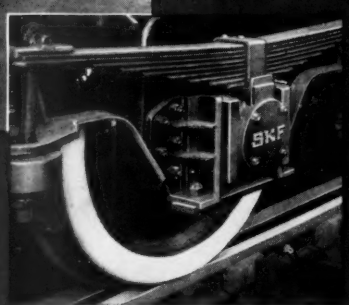

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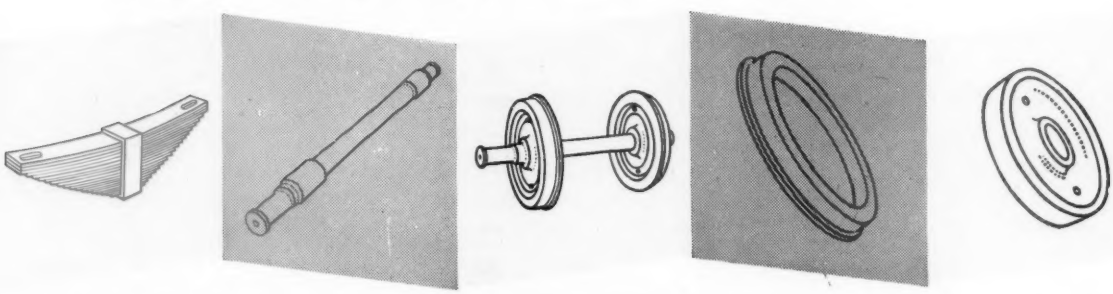

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Railway Traffic Increases

SINCE petrol rationing began last December there has been an increase of 20 per cent in passenger traffic on British Railways. The indications are that the increase has been mainly in suburban traffic. Long-distance journeys by private motorcar are normally much reduced during the winter months, which goes far to explain the relatively small advance reported in express passenger traffic. The rise in freight traffic has been of some 25 per cent, making allowances for the rate at which traffic was being lost to the railways before the Suez crisis. Sir Brian Robertson, Chairman of the British Transport Commission, takes an optimistic view of the situation. He told the Nottingham Chamber of Commerce last week that many traders who previously had not used the railways to any extent had learnt much about the services provided by British Railways, which in their turn had gathered much information about such traders' requirements. Coal class traffic by rail has risen by some 250,000 tons a week. Some of this is attributable to greater coal production, and only 60,000 tons to fuel rationing. The fact that 27 per cent of all coal class traffic moves by other means of transport suggests that, even allowing for the needs of local distribution, for which railways are unsuitable, there is still a great deal of this traffic which is not moving by rail and for which the railways have capacity. On the other hand, there can be no doubt that transit times for general merchandise, with 40 per cent more braked freight trains running than in 1951 and twice as many as before the war, are improving rapidly. The new and improved marshalling yards and freight terminals now planned and under construction should make even greater advances possible not only in reducing transit times, but also in lowering the cost of carriage. It may well be that the maximum charges scheme will be in force before road services get back to normal. This will give British Railways an even greater chance of retaining the traffic now passing.

British Railways Locomotive Building Programme

THE chief interest in the list on page 319, of 417 locomotives of all types to be built during the current year is in the prototype diesel locomotives allotted to private builders. Comparison with the table in our issue of November 25, 1955, which gave details of the orders placed for 130 diesel-electric, and 11 diesel-hydraulic main-line locomotives with Voith turbo transmission, shows that 35 of the former and all of the latter are to be completed by contractors in 1957, the diesel-hydraulic locomotives being built by the North British Locomotive Co. Ltd., which firm is also supplying some 18 diesel-hydraulic shunters. In addition, three 2,000-h.p. main-line diesel-hydraulic locomotives of type "C" are being built at Swindon under arrangements made with the Brush Group for the purchase of Maybach engines and with J. Stone & Co. (Deptford) Ltd. for Mekydro transmissions. As to steam engines, it is assumed that a main object of building 66 heavy goods 2-10-0s, besides smaller locomotives of standard types, is by permitting scrapping of older non-standard engines, to facilitate maintenance and repairs through use of standard parts, particularly boilers.

Transport of Oil and Petrol

SOME of the economic considerations affecting the choice of rail or road for movement of the products of the oil industry were explained by Mr. A. G. Taylor, Manager, Inland Distribution Department, Esso Petroleum Co. Ltd., in a recent talk to the Railway Students' Association. Deliveries to actual customers must nearly always be by road, but supplies to inland plants can be made by either rail or road, or sometimes both. The choice, however, often lies not between rail or road supply from a coastal plant to an inland plant, but between rail supply to the inland plant and then final delivery by road, or direct road delivery from coastal plant to customer. If the intermediate depot can be cut out it saves a considerable handling cost and also the leakage which occurs every time the product is handled through a plant. This leakage cost, where the product is a dutiable one, may amount to 7s. a ton at a duty-paid plant. The industry does, nevertheless, use rail transport extensively and operates a fleet of several thousand tank wagons. Many more are being built to handle the rapidly increasing business in fuel oil for industrial purposes.

Hard Work Needed from All

THE importance of hard work by all railwaymen in carrying out the British Railways modernisation plan is emphasised by "The Man on the Line" in his editorial, in the March issue of *British Railways Magazine*. However important new machines and equipment may be, he points out, it is, in the end, men that matter—and by men is meant all employed by the railways, management and staff. In support of this he quotes the forthright remarks made by the Minister of Transport & Civil Aviation, Mr. Harold Watkinson, in the House of Commons debate on the Transport (Railway Finances) Bill, on which we commented in our January 25 issue; he also quotes the words,

in the same strain, of Lord Burden, a former railway trade unionist, during the Lords debate on the Bill. "Railwaymen must realise," he said, "that there is not a bottomless purse from which they can accept monies in vast sums as a subsidy to the railway industry. . . . If they themselves are not prepared, in these five or six brief years, to put the industry on a sound financial footing, then the railways will go the way of the stage coach."

Overseas Railway Traffics

OPERATING revenues of the Canadian National Railways for the month of January amounted to $65,655,000. Expenses, taxes, and rents totalled $64,677,000 making the net operating income for the month $978,000. For January, 1956, operating revenues were $56,082,000; expenses, taxes, and rents were $57,946,000; and the net operating loss was $1,864,000. Canadian Pacific railway revenues for January were $25,682,267 (against $36,584,167 for January, 1956) and railway expenses $29,066,026 ($36,023,175), so that there was a deficit of $3,383,759 ($560,992 profit). Costa Rica Railway receipts for January were colones 1,639,918, compared with colones 1,919,281 for January, 1956; the aggregate receipts for the seven months July—January were colones 10,944,987 (11,840,567). Paraguay Central Railway receipts for the week ended February 15, were G1,509,917, an increase of G77,020 on the corresponding week of 1956. Aggregate receipts from July 1, 1956, amounted to G62,347,141 against G44,438,566 for the corresponding period of 1955/56. East African Railways & Harbours total earnings for January were approximately £1,859,000 compared with £1,952,000 in the same month last year, and £1,908,000 in December, 1956; railway earnings were £75,000 below the level estimated for January, and harbour earnings were £19,000 below estimates.

Main-Line Electrification Equipment

IN preparation for the 50 cycle a.c. electrification of the Crewe to Manchester line, the London Midland Region of British Railways has placed an order with the Westinghouse Brake & Signal Co. Ltd. for the supply and installation of Westatic track circuiting equipment which has been specially developed to meet the requirements of this form of traction. The section from Wilmslow to Slade Lane Junction has been selected for this first installation, and entails the provision of 22 double-rail and 36 single-rail track circuits, the general principle being to adopt the former for the berth tracks, up to 4,000 ft. in length, and the latter for the overlap tracks which do not exceed 1,800 ft. in length. From the range of Westatic equipments available, the styles "AS2" and "R" have been selected for the berth and overlap track circuits, respectively. A characteristic feature of both of these arrangements is that they operate directly from an a.c. signalling supply of the same frequency as the traction, and make no use of moving parts except for the associated relays.

L.M.R. Plans for the Birmingham Area

RECONSTRUCTION of New Street Station is one of the plans for Birmingham in connection with railway modernisation. Announcing this last week, Lord Rusholme, Chairman of the London Midland Area Board, who, with the other members was in Birmingham for the monthly meeting of the Board, stated that the work would probably be completed in some 10 years' time, before completion of electrification of the Western Division main line between Euston and Manchester and Liverpool via Birmingham. In connection with the electrification, the Board had earlier inspected the sites for flyovers at Bletchley and Rugby, also Coventry, where the passenger station is to be rebuilt with a new parcels depot. Before the coming of electrification, Lord Rusholme added, inter-urban diesel trains would afford more and quicker services to and from Birmingham, Liverpool, and Manchester; more lightweight diesel trains would operate in the area by 1958, between Birmingham, Derby, Leicester, Coventry, Nuneaton, Stafford, Leamington and Wolverhampton. Other plans for the Birmingham area include a new carriage cleaning depot at Wolverhampton; a depot at Garrison Street, Birmingham, for the servicing of railway road motor fleet; and at Walsall there is to be a maintenance depot for multiple unit diesels.

Two-Way Working at Stations

TWO additions to the comparatively small number of stations in this country where two-way working in the station area is provided for have been announced recently. One of these, in the Eastern Region, is Thorpe-le-Soken, where trains from Colchester are split into two portions, one for Clacton and the other for Walton, with the reverse process for up trains. No doubt the number of trains passing through Thorpe-le-Soken will be increased considerably when electrification on the 50-cycle system is completed on this branch, which is to be a testing ground for new equipment. The two-way working will allow trains stopped for division to be by-passed. The other project is at Port Talbot General station, in the Western Region, where it will enable expected increases of traffic to be dealt with more expeditiously. Two-way working has now proved itself, with modern signalling, to be so effective in reducing the number of tracks required on main lines in, for example, France and the U.S.A., that it might well be applied in Britain at places, such as tunnels and large bridges, where track capacity is reaching saturation point but the building of a third or fourth road would be unreasonably expensive.

Ten Years of Schindler

A SMALL exhibition was held recently at Pratteln, near Basle, to commemorate the first 10 years' work of Schindler Wagons S.A., the youngest of the three Swiss carriage and wagon manufacturers. An offshoot of the well-known Schindler lift company, the Pratteln factory began active work by the repair of some 2,500 French wagons, followed by the building of lightweight steel coaches for the Swiss Federal Railways. In 1947 the first export order was received—61 suburban passenger coaches for the Portuguese Railways. At an early stage a new form of lightweight passenger coach construction was evolved, carrying a step further the principles already practised in Switzerland. Similarly, modifications were made to the well-known "Swiss" bogie, into which Schindler incorporated its own type of hydraulic damper. Additional to almost continuous construction of standard passenger and freight stock and electric-train vehicles for the S.B.B., the works have also built notable motor coaches for Swiss rack railways; and also have supplied much high-quality rolling stock for export, including 57 de luxe passenger coaches for Mexico, diesel-mechanical rack-braked railcars and lightweight trailers for Chile, and wagons for Interfrigo; they are now constructing electric trains for Spain and India, 800 b.h.p. diesel-hydraulic railcars for Ceylon, 187 freight wagons, ordered by Eurofima, and electric trains for the Centovalli Railway.

German Electrification Policy Defended

THE adoption of the 50-cycle a.c. system of electrification in France and other countries and the publicity given thereto by the authorities concerned have resulted in extensive criticism being levelled in Germany in a variety of ways at the Federal Railway management for continuing to extend the low-frequency system, extensively used on its lines for some years, in common with the Swiss, Austrian, Norwegian and Swedish railways. Appreciable new lengths of main line are at present being equipped with it as, for example, in the southern part of the Rhine valley and the Ruhr district. This criticism assumed such proportions that the Bundesbahn authorities at length felt obliged to issue a reasoned statement defending their policy and this has appeared as a special number of the journal *Elektrische Bahnen*. The comment and

arguments it contains are based on the papers read and documents presented at the Lille conference of May, 1955, to which the French National Railways invited a number of foreign engineers, and are directed to showing that German conditions fully justify the continued use of low-frequency working and that no advantage would be gained by introducing something else for general purposes. At the same time, any criticism of the 50-cycle system, as such, or of the electrification policy of the French authorities, is expressly disavowed.

Brussels World Exhibition, 1958

PLANS for British participation in the Universal & International Exhibition, Brussels, 1958, to which further reference is made on page 322, have been made known by the British Electrical & Allied Manufacturers' Association which, at the request of H.M. Government, is organising the British Electrical Engineering Section. The range of the whole Exhibition—the theme of which is "Man and his Aspirations"—covers literally every aspect of human activity, including the arts, but it is understood that the United Kingdom will concentrate on those aspects of technological achievement in which Britain leads the world. Foremost among such aspects will be those covered by the Power & Energy Section, which will occupy a large percentage of the British site area of 5 acres, in itself a substantial proportion of the total exhibition area of 500 acres.

The Belgian Government, which is taking advantage of the opportunity afforded by the Exhibition to improve its road system within Brussels, is spending a sum of £60 millions on the project: the British Government's bill is estimated at £500,000, and private industry is planning a disbursement of an equal amount for construction alone. A marriage between private and public enterprise is sought, and towards this end an Advisory Committee to report on progress has been set up, membership of which includes a number of prominent members of industry and public life. The Organising Committee of the British Electrical Engineering Section is under the Chairmanship of Mr. D. Maxwell Buist, Export Director of B.E.A.M.A., and the Organising Secretary of this body is Mr. Sam Black.

From details already available it is evident that a number of interesting special constructions will be connected with the Exhibition site generally and with the British site specifically. Examples of the former include an under-site tramway system. On the British site a studio cinema will show government and industrial films, more particularly to cover those products whose size precludes exhibition. An information service will make available interpreters of many languages for the benefit of the genuine trade buyer, who is also catered for by the complete innovation of a special telephone exchange permitting him to dial direct to this country and thus to contact vendors without delay. Home comforts will be available at a British Inn specially designed by the architect of the Federation of British Industries.

Transport will be treated by the Exhibition on an international basis, and British Railways will take part in this exhibit. There will be a comprehensive electrical section in which electric traction will be covered on road, rail, in the air, and on water. This will also form an important part of the B.E.A.M.A. contribution. Although the Commonwealth as a whole will be represented in the British Government Pavilion under a section dealing with the British way of life, Canada and Pakistan are showing separate exhibits. Canada in particular is taking a very active interest in the project. At this stage it is not possible to state whether India will be one of the participants.

The Belgian Government is planning energetic measures to ensure complete co-operation with all interested parties in this country and to this end will negotiate special arrangements with British Railways and British European Airways for the transport of those wishing to attend the Exhibition.

Gathering Pace

THE first reaction to reading the details of the work of railway modernisation in Britain in 1957-58, given elsewhere in this issue, must be satisfaction that British Railways and the many contractors have been able to adhere, despite many difficulties, to the plans formulated in 1955. This gratification is increased on noting the improvements on the original conceptions as further details of the various schemes are announced, besides the acceleration of tempo which has become possible as the plan gets into its stride. Introducing the plans for the next two years, Sir Brian Robertson, Chairman of the British Transport Commission, remarked at a Press conference last week that he felt the developments in the next two years would be exciting, and, for the railway staff, stimulating. If he overstated his case in hoping that the public would feel some thrill when it read them it was a pardonable enthusiasm. The public at least knows, from these plans and, much more important, from what it sees with its own eyes, that the days of apparent railway stagnation are over. The daily Press, which has not always been sympathetic to the railways, has received the plans with virtually unqualified approval.

In the long-term aspect, the most important news is that electrification projects are going so well that they are likely to be finished well before 1970, when the present modernisation plan should be completed. This acceleration of pace has led the Commission to start considering further electrification, including the logical, but previously rather remote, continuation of the East Coast main line electrification to Edinburgh. For the maximum effect on public opinion, it has always been essential that some signs of modernisation should be visible in the London area, where there is the greatest concentration of population, but it is here that work is most costly and requires most planning, so that little has been seen. This will be remedied in the next two years when work on the London, Tilbury & Southern electrification will reach an advanced stage and much will be done towards electrification of the remaining suburban lines from Liverpool Street. Away from London, the Colchester-Clacton branch, with its offshoot to Walton, will be electrified on the 25-kV. 50-cycle system by next year, and will be used as a testing ground for new equipment. The first stages of electrification work in the Glasgow suburban area and on the Southern Region Kent Coast extensions will be taken in hand. Twenty electric main-line locomotives, presumably to work at 25 kV., will be delivered before the end of 1958. No details of these have yet been announced.

Diesel traction, with its more immediate benefits, will enter a new phase with the construction of five diesel-electric de-luxe trains for the London-Manchester, London-Birmingham-Wolverhampton, and London-Bristol routes. These, the first of the "100-m.p.h." trains heralded in the modernisation plan, should have an immediate appeal to those travelling on business. With a 3-hr. timing to Manchester they will do much to counter the drain of this traffic to air services when they start running in 1958.

The mainstay of diesel development on main lines will be the diesel locomotives, 230 of which are on order or authorised. This year will see the first 50 running in service or on trials and they will be followed by a further 100 in 1958. On their performance will depend the final decisions on the types to be ordered in the years ahead to bring the fleet up to the strength of 2,500 mentioned in the plan. The successful diesel multiple-unit trains will be strengthened by more than 1,000 vehicles this year and 1,200 in 1958.

A number of rebuilding and improvement schemes is in hand for passenger stations, and, though not prepared to disclose details at this stage, Sir Brian Robertson revealed that the Commission has plans for some London termini. Alterations at Cannon Street and other stations have made it possible to run 10-car trains on certain Southern Region services, and further work will allow 12-car trains to be used by the middle of next year.

Less in the public eye, but even more important to the

national economy and to the railways, are the improvements to be made to freight services. The programme for fitting freight vehicles with the vacuum brake—which the railways are now even more convinced was, for them, the right brake to specify—is expected to make rapid progress, though, reading between the lines, it seems that some new wagons will still be turned out without it this year. The whole programme of brake-fitting should be finished in less than the 10 years originally envisaged. The automatic coupler being developed, if successful, may necessitate yet another programme of conversion.

Large deliveries of wagons in the next two years will enable the railways to dispense with some of the older stock. Measures to improve traffic flows include the flyovers being built to avoid conflicting movements. That at Bletchley is part of an important scheme for keeping traffic which must cross London away from the congested centre. It is the railway equivalent of a by-pass road, and should make great improvements in transit timings possible. Of the new connecting lines being built for the same purpose of easing traffic flows the most ambitious is the double-track line between Craiglockhart and Slateford, to be started this year. This will enable traffic from the west, particularly coal, to be worked round the Edinburgh South Side Suburban line to Niddrie Junction and the new marshalling yard at Millerhill. Improvements in signalling in the North Eastern Region will enable freight trains to be switched from the Leeds-Harrogate-Northallerton line, where double-heading is often required, to the main line.

A minor issue for the public, but vital to the railways, is the effect which plans such as these, with their story of progress and achievement, is likely to have on recruiting. For the technically-qualified staff of which the railways stand in such need they offer the prospect of an exacting but exciting career, with a multiplicity of new problems to face and overcome. For the remainder of the staff they hold out hopes of belonging to a thriving modern industry and working with equipment which it is a pleasure to use. Furthermore, an efficient, technically-minded industry should be one in which, though greater demands are made on the individual, the prospects of higher reward for all members of the staff and promotion for those who fit themselves for it are infinitely better.

Future Freight Charges

SINCE the British Transport Commission (Railway Merchandise) Charges Scheme was confirmed at the beginning of the year, there has been much speculation on the charging principles which will be used after the scheme comes into force on July 1. Some of these questions were answered in a paper read to the Institute of Transport in London last Monday by Mr. A. A. Harrison, Chief Charges Officer, British Railways Central Staff, British Transport Commission. A large part of Mr. Harrison's long and brilliant paper was taken up with a survey of the history of railway charging practice, but as this was covered briefly in our issues of January 11 and February 8, and the second half of the paper is of more immediate interest, we shall not deal with the historical part of the paper here. Nevertheless, Mr. Harrison covers the subject so thoroughly and entertainingly that it should be studied closely when it appears, in due course, in the *Journal* of the Institute.

Before considering the confirmed scheme, Mr. Harrison notes that the 1953 Transport Act, from which the present scheme springs, had three immediate effects. It repealed the 1854 legislation relating to undue preference and legislation dating back to 1845 in respect of equality of charges, and it permitted the agreement of rates with any trader for the carriage of all or any part of his merchandise. Many thousand such "agreement rates" are already in operation. As regards the confirmed scheme, details of which were given in our issue of January 11, the Transport Tribunal accepted the Commission proposals on graduated maximum charges related to consignment weight and loadability instead of commodity value. It accepted the principle of a 10-mile standing charge with a ton-mile progression rate thereafter and also accepted determination of the level of these maximum charges by reference to costs incurred in adverse but not extremely adverse circumstances. On the other hand, it narrowed the field for maximum charges by providing that there should be reasonable charges for 100-ton consignments and for traffic in owner's wagons. On the evidence, it decided that the level of maxima proposed by the Commission was not fully justified, and a lower level was authorised. The idea of a single set of maxima was also rejected and a differentiation was made between certain bulk traffics and other traffics and between station and private siding traffic.

After outlining the scheme, he points out that it reflects very clearly and precisely the Tribunal decisions on a subject which is far from simple. It cannot be altered until it has been in force for at least a year, but the Commission can lodge a new scheme at any time. After July 1, the Commission will be able to make use of Section 23 of the 1953 Act, under which the maximum charges can be increased temporarily pending subsequent confirmation or otherwise by the Tribunal. The scheme will certainly provide more freedom in freight charging, but not to the degree enjoyed by the railways' principal competitors. Mr. Harrison regards the limitations as quite severe. The requirement of reasonableness in charging consignments of 100 tons or more, as he maintains, is more potentially restrictive than many people imagine—it might affect a quarter of the freight revenue. The similar requirement for owner's wagon traffic affects probably no more than 5 per cent of freight revenue, but, nevertheless, is still a limitation. The restrictive effect of Section 22 of the 1953 Act, dealing with traffic which cannot reasonably be carried by any other means of transport, remains to be seen, but it has a potential bearing on perhaps another quarter of the freight revenue. The authorised maxima for traffic in the Commission's own wagons are effectively restrictive for a considerable volume of traffic. The authorised maxima are lower than the charges now being levied for an appreciable quantity of good loading traffic passing over medium distances.

Reasonable charges, in the event of challenge, are whatever the Tribunal determines after hearing evidence and argument, and are not as precise as maximum charges. British Railways will re-organise their freight charging arrangements so as to encourage traffic consigned in larger quantities and good wagon loads; regular traffic for which economical services can be arranged; and good loading traffic, now passing by road, for long and medium distances. It will also attempt to avoid loss on some shorter distance traffic. The Commission will continue to use most of the rates in active use at July 1 until all such rates can be reviewed. All existing coal and coke rates will continue; all exceptional rates on mineral and merchandise traffic used between January, 1955, and July, 1957, apart from "any quantity" rates not retained as 1-ton rates; most livestock rates; and all "live" rates for merchandise by passenger train except returned empties. This "cushion" contains almost 1,000,000 rates and will cover the bulk of wagon load traffic now passing by railway. For traffic not so covered, the Commission has indicated that it will make known its new charges to bona-fide inquirers with traffic to offer. For consignments of up to 1 ton, which now pass, except for the 25 per cent or so subject to agreed charges, at standard rates, new scales will be issued which will reflect the influence of cost and market represented by bulk in relation to weight, by damageability, and by route. The differentiation will be made by simple and straightforward scaling. More than one-eighth of railway freight revenue comes from small consignments, so that the immediate impact of the charges scheme on July 1 will be considerable.

The task of making the new discretionary rates in the years ahead will call for the exercise of commercial judgment amid many imponderables. The emphasis will be on net rather than gross revenue. The new procedure must be fast enough and local enough to get the business. As

greater refinement of cost information becomes available, more help can be provided to the ratemaker. Modern telecommunications and electronic calculators offer tremendous possibilities. Where there is strong competition for traffic, it is often as important to know the costs of the competitor as those of the railways. Rates could be withdrawn the next day if necessary, thus minimising the effect of errors.

A special form of charge having great attractions is the two-part tariff. In this system, a standing charge is made irrespective of traffic volume and a scale of charges is applied to units of traffic actually carried. The level of the scale forming the variable part of the tariff can be such as to bring home to traders the potential cheapness and benefits available from using available capacity. It can also pass on to users the advantages in diminished costs of an expanding railway industry. In concluding his paper, which, it has been said, describes the commercial equivalent of the modernisation plan for railway operating, Mr. Harrison emphasises that the Commission believes that modernisation, increased productivity, and freedom of charging will enable the rising railwaymen of today to take British Railways "out of the red."

British Transport Commission Traffic Receipts

SUBSTANTIAL increases in British Railways passenger and freight traffics brought about by the diversion of traffic from road because of the fuel situation, are again reflected in the transport statistics issued by the British Transport Commission, namely, the advance figures for Period 2, the four weeks to February 24. The receipts include the various surcharges imposed to cover the increased cost of oil fuel.

—	Four weeks to February 24,		Incr. or decr.	Aggregate for eight weeks		Incr. or decr.
	1957	1956		1957	1956	
	£000	£000	£000	£000	£000	£000
Passengers—						
British Railways ..	8,987	7,294	+ 1,693	17,929	14,609	+ 3,320
London Transport:						
Railways	1,824	1,641	+ 183	3,712	3,330	+ 382
Road Services ..	4,587	3,898	+ 689	9,217	7,957	+ 1,260
Provincial & Scottish buses	4,236	3,471	+ 765	8,546	7,084	+ 1,462
Ships	164	164	—	400	402	— 2
Total passengers ..	19,798	16,468	+ 3,330	39,804	33,382	+ 6,422
Freight, Parcels & Mails—						
British Railways:						
Merchandise & livestock	9,522	7,930	+ 1,592	18,917	15,939	+ 2,978
Minerals	4,339	3,927	+ 412	8,752	8,035	+ 717
Coal & coke ..	11,255	9,910	+ 1,345	21,901	19,855	+ 2,046
Parcels, etc., by passenger train ..	3,774	3,390	+ 384	7,360	6,621	+ 739
Collection & delivery, etc. ..	1,118	940	+ 178	2,123	1,879	+ 244
Total freight, British Railways	30,008	26,097	+ 3,911	59,053	52,329	+ 6,724
Others	4,171	4,136	+ 35	8,118	8,300	— 182
Total freight, parcels & mails	34,179	30,233	+ 3,946	67,171	60,629	+ 6,542
Total	53,977	46,701	+ 7,276	106,975	94,011	+ 12,964

British Railways passenger receipts at £8,987,000 compare with £8,942,000 for the preceding four weeks, an increase being seasonal. They are 23 per cent above the corresponding figure for 1956, as might have been expected from the Period 1 figure, which showed about the same increase over last year. London Transport railway receipts about 11 per cent up on the 1956 figure, as was the case with the previous four-week period; the road services receipts at £4,587,000 are 18 per cent over the corresponding period of 1956, and compare with £4,630,000 for Period 1, with an increase over Period 1 of last year of 14 per cent. Provincial and Scottish bus receipts for Period 2 exceed last year's figure by 22 per cent.

The Commission estimates that British Railways passenger receipts are about 20 per cent higher than they would have been had there been no fuel rationing. Out of the increase of 16 per cent in London Transport total traffic receipts, only about 9 per cent, it is thought, represents additional traffic resulting from rationing.

Having regard to the downward trend of merchandise traffic last year, it is possible to agree with the Commission estimate that the improvement in the receipts from this traffic as a result of the fuel restrictions is about 25 per cent. Only some 2 per cent out of the 14 per cent increase in coal and coke receipts is attributable to the oil situation. The very substantial increase in merchandise receipts appears to reflect the return to the railways of the valuable and long-distance traffic which was previously passing by road. Even so, there is still spare capacity.

PERCENTAGE VARIATION 1957 COMPARED WITH 1956

	Four weeks to February 24	Eight weeks to February 24
British Railways—		
Passengers	+23·2	+22·7
Parcels	+11·3	+11·1
Merchandise & livestock	+20·0	+18·6
Minerals	+10·4	+ 8·9
Coal & coke	+13·5	+10·3
C. & D. services	+18·9	+12·9
Total	+16·7	+15·0
Ships (passengers)	—	—
British Road Services, Inland Waterways and Ships (cargo)	+ 0·8	− 2·1
Road Passenger Transport, Provincial & Scottish ..	+22·0	+20·6
London Transport—		
Railways	+11·1	+11·4
Road services	+17·6	+15·8
Total	+15·7	+14·5
Aggregate	+15·5	+13·7

The Canadian Pacific Railway in 1956

THE national economy of Canada in 1956 was stimulated by unprecedented capital outlays for plant and equipment by domestic business and industry as well as foreign investors, who thereby reaffirmed in spectacular fashion their faith in Canada's future. The high level of business and industrial activity throughout 1956 maintained prosperity in almost all segments of the economy. In contrast with 1955, when mining and residential construction were the pace-setters, manufacturing industries, both primary and secondary, with a few notable exceptions, have been in the vanguard of economic advance in 1956. Agriculture, too, has shared in the gains recorded, and farm income promises to reach the highest level since 1951. In his annual review of Canadian Pacific Railway developments last year, Mr. N. R. Crump, President, stated that the railways had not been sharing in this general prosperity of the Canadian economy. Traffic volume had been high, but the net financial returns were low. The return to the C.P.R. Company on net railway investment in 1956, he pointed out, would be only about 3·2 per cent, substantially less than earnings in other industries, and even less than the current return available to the investor in many issues of Dominion of Canada bonds, a completely risk-free security.

So inadequate a return on rail investment, Mr. Crump maintains, despite the substantial increase in the demand for essential rail transport which has occurred in 1956, is compelling evidence of the need for relaxation of outmoded regulation so necessary if the railway industry is to meet increasing competition and provide the transportation services required of it in a rapidly expanding economy. It also lends a sense of urgency to the efforts of Canadian Pacific to avail itself without hindrance of the advantages of technological change, in a manner consistent with its obligations to the public and to its own employees. Confident that these objectives would be accorded public recognition, Canadian Pacific, which marked its 75th birthday in 1956, continued its programme of modernisation and expansion in the realms of transportation on land, at sea and in the air. This programme was highlighted by the entry into service of the 25,500-ton *Empress of Britain*, flagship of the Canadian Pacific fleet;

the commencement of construction of a $10 million addition to the Royal York Hotel; the signing of a contract for a new office building at Vancouver which will serve as the centre for Canadian Pacific Air Lines' $20 million Bristol Britannia expansion programme and by the addition of new diesel locomotive units and railcars.

Continuing the company's programme of conversion to diesel traction, begun in 1943, 115 new diesel units were put into service during the year. This brings the number of diesel units in service to 670, a considerable stride in the company's plan to attain complete conversion by 1961. Additional "Dayliners"—high-speed, self-propelled rail diesel cars—were also introduced. These popular units went into operation in Nova Scotia on the Dominion Atlantic Railway, a subsidiary of the C.P.R. They also made their appearance on the Montreal-Boston run, marking their first entry into the Canadian Pacific international service. Similarly, diesel cars have been placed on the Montreal-Sutton, Moose Jaw—Calgary, Sudbury-Fort William, and Toronto-Owen Sound runs. A total of 31 of these units is now in service and an additional 11 for delivery in 1957 are on order. They have proved extremely popular on passenger runs in eight provinces and are expected to play a continuing rôle in Canadian Pacific operations from coast to coast. About 4,000 freight cars were added to the company's fleet.

The integrated data processing (I.D.P.) programme for streamlining accounting and other railway paper work, which was begun in 1955, is going forward and rapid conversion from traditional procedures, affecting nearly all departments, is taking place. The physical installation at headquarters of the large electronic computer, equipped with memory core, is now in progress. Operation on an expanding scale will be effected early in 1957. The first deliveries of new yard office and freight office equipment for the automatic recording of source data, which were designed to Canadian Pacific specifications and are the first of their kind in use anywhere, have been received and are being put into operation under the new procedures, office by office, as deliveries are made. The extensive communication network, which links the I.D.P. system together, is nearing completion.

LETTERS TO THE EDITOR

(*The Editor is not responsible for opinions of correspondents*)

N.U.R. Wage Claim

March 11

SIR,—In the editorial note "Wage Claims in Progress" in your March 1 issue, Mr. A. B. B. Valentine is reported as saying at the hearing by the Railway Staff National Tribunal of the N.U.R. wage claim that "the Commission had a duty to resist the claim in so far as it was a general one, on the grounds of financial difficulties."

What Mr. Valentine actually said, however, was that "the Commission have a duty to resist the claim on grounds of financial difficulties in so far as the claim is a general one, for something extra on all standard rates of pay, something more than a fair adequate level of wages all round, because of the benefits accruing to the industry from increased productivity." He went on to say "that does not mean that the staff either ought to be, or will go unrewarded for increased productivity to which they make a real contribution by their own efforts and co-operation."

It would be appreciated if you could find space in a forthcoming issue to give the full text of Mr. Valentine's remarks quoted above.

Yours faithfully,

J. H. BREBNER
Public Relations Adviser

British Transport Commission,
222, Marylebone Road, N.W.1

Site for a Transport Museum

March 4

SIR,—With great respect I must take leave to disagree entirely with my old and most valued friend, Jack Brebner, when he asserts in his letter in your March 1 issue, that Brighton Works as the site of a national transport museum must take second place to Brighton Works as a shock-absorber for any of the British Transport Commission's employees displaced by its closing as a locomotive works. Whilst nobody would be, today, so lacking in humanity as not to wish every consideration to be given to loyal servants who through no fault of their own may have become redundant, emphatically the claims of a national transport museum, which would bring untold prosperity to Brighton in future years and untold prestige to Britain, must come first.

Notoriously, railway administrations can never see the wood for the trees. When Mr. Brebner speaks of giving us a national museum "as soon as suitable premises can be made available and adapted without unreasonable expense," he gives the whole show away. The time for a national museum is *now*—not in the problematic future, when the Commission may have cash in hand—and the "valuable and extensive collection," of which he speaks, has been lost through lack of proper maintenance and accommodation. Furthermore, how many, one must ask, of the men employed by the Commission at Brighton Works are nearing retirement age in any event? And why cannot work be found for the remainder, either at Lancing or some other railway works?

Brighton Works are ideally sited and suited to become a really worthy and distinguished transport museum; and if the town of Brighton had any real appreciation of its own interests it would not be content to see this great opportunity to add permanently to its attractions lost to it for a purely ephemeral industrial palliative.

As for "reasonable expense," the museum would, in the opinion of many well qualified to judge, pay for itself in a very few years—but in any event, the Commission, as Mr. Brebner clearly recognises, has a public responsibility in this matter. And of course the money is available. Let the Commission economise, as it might with advantage, over some of its infinitely costly and questionably advantageous "modernisation" plans.

"That's the way the money goes
POP (and how!) goes the Diesel!"

Pray let the British Transport Commission be under no illusions: if it fritters away the promises it has given and takes up the attitude that the museum can wait, it is going to let the public down in a very big way indeed.

Yours faithfully,

HENRY MAXWELL

106, Ashley Gardens, S.W.1

Wotton Tramway Locomotive

February 20

SIR,—I refer to the letter from Mr. A. T. Newham published in your issue of February 8. The photograph mentioned is well known to me. The spark arrester, the cab, and the plate over the cylinders are not of Aveling & Porter design and I am quite certain that these, with the chimney extension, were fitted on the Wotton line to suit local conditions.

It is, therefore, more than likely that both locomotives were similarly altered and the actual identity of the engine shown in the photograph is still uncertain.

Yours faithfully,

G. ALLIEZ

96, Radnor Road, Twickenham, Middlesex

THE SCRAP HEAP

Cat Nap

A tabby cat circled London several times in an Inner Circle Underground train before Aldgate porters woke her up, lifted her from her seat and took her to a P.D.S.A. clinic.—*From the "News Chronicle."*

South Bank Bastion

Passengers who alight at the departure entrance of Waterloo Air Terminal generally turn their backs on two blind arches across the way, supporting a square bastion of grey brick. The bastion, odd as it now looks alongside the airy offices of British European Airways' cargo department, is an old railway turntable abutting on the Charing Cross viaduct. It will now be torn down to make way for the new Shell-Mex House.

As for the railways, loss of the turntable will not mean a traffic jam at the entrance to Hungerford Bridge. The turntable has been out of use since the Festival of Britain, when it supported a diesel-electric engine as a showpiece.—*From "The Manchester Guardian."*

Last of the "Brewery Shunters"

With the withdrawal from stock of London Midland Region No. 47862, the last has been seen of the former L.N.W.R. 0-4-2 goods tank engines designed by F. W. Webb. Twenty were built at Crewe between 1896 and 1901 and were used mainly for shunting duties, more particularly at breweries, which accounts for their frequently being referred to as "Brewery Shunters." No. 47862 was built in 1901 and originally numbered 823 in the L.N.W.R. stock; it was renumbered on three occasions, finally 47862 in March, 1949. The cylinders are 17 in. dia. by 24 in. stroke, the total wheelbase 15 ft. 6 in., coupled wheels 4 ft. 5½ in. dia.; boiler pressure 150 lb. p.s.i., total weight in working order 34 tons 17 cwt., and tractive effort 16,530 lb. at 85 per cent. boiler pressure.

Racehorse on the Wrong Track

After falling in a race at Ludlow racecourse, a racehorse ran out of the course and galloped down the railway line for three miles in the direction of Shrewsbury. Signals were set at danger and two trains waited until the horse was recovered.

Locomotive Turning Triangles

The price of land, more especially in or near towns with important stations as depots, presumably has been the reason for the rarity in this country of the triangle—or Y, as it is sometimes called—for turning engines, or vehicles when required. It is a common feature in North America, and is not unknown in India, for instance. A correspondent states that Colonel G. T. Landmann, Engineer of the London & Greenwich, built one on that line in 1838—where, it is not stated, but presumably near the terminus at Greenwich, as only at that point could enough land have been available, even with curves of minimum radius. A triangle is stated to have been considered at Armagh, on the Ulster Railway (later the G.N.R. (I)), but to have been abandoned for lack of land.

When a turntable for some reason cannot be used, or it is desired to turn a train round, such as a Royal train, retaining the order of marshalling, resort must be had to running engines or rakes of vehicles over a triangular route. It is stated, for instance, that when the Marsh Atlantics of the L.B.S.C.R. began to run to and from Eastbourne in 1909 or soon afterwards, the new, and adequately long, turntable there was not ready, so that these engines for some time had to be run light to Polegate, thence to Pevensey, and back to Eastbourne—some 11 miles—between down and up workings.

Available by Any Train

In an article in *The Times Literary Supplement* on the journals of Thomas Talfourd, Vera Watson records:—

The next morning [in October, 1852, after a derailment in a tunnel near Hastings the previous day] there were doubts as to whether the excursion train [from Hastings to Margate] would run; so Talfourd, patience exhausted, hired a carriage and drove to Ashford. "Here (he recorded in his diary) I had a smartish controversy with a smartish Clerk as to whether my poor Excursion Ticket would take me to Margate—he said it would enable me to proceed by 'The Excursion Train' which would come from Hastings in 2 or 3 hours."

This was adding insult to injury, and the exasperated excursionist threatened to put in a claim for compensation and expenses against the railway company, with the result that he was "very civilly" begged "to go by any train."

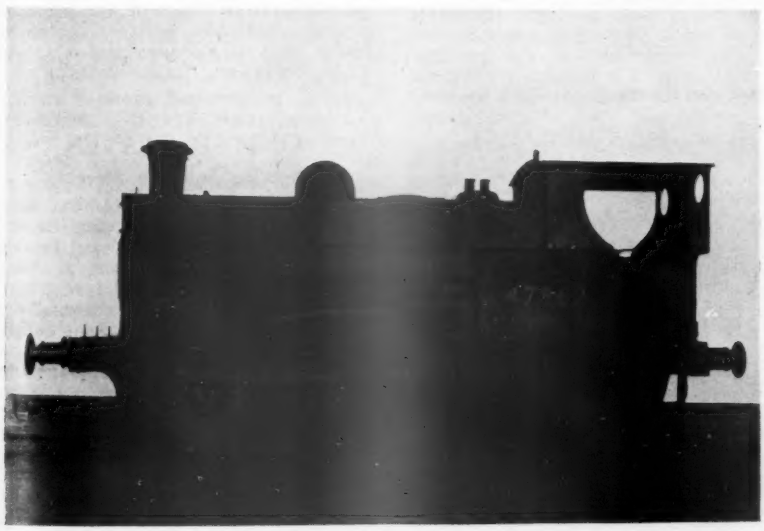
Station Gardens

When Spring plays hide and seek around the corner
And east winds do their level best to harden
Our arteries, enthusiastic porters,
If any, start to think about the garden.
They know that frozen patch, along the platform,
Though now bereft of any claim to glory,
Will teem with life again, when nature quickens,
And summertime will tell another story.

It only needs a change of wind and weather
To bring about the age-old transformations
And send the most incurable rheumatic
Scuttling with spade and fork to action stations.
With practised skill he scatters winter's traces,
Reducing all to horticultural order,
Devising schemes, in times of perspiration,
For keeping cats off the herbaceous border.

His honest partnership with re-creation,
Accomplished in his so-called hours of leisure,
Will bring to countless transient admirers
A fleeting flash of joy and instant pleasure.
Although he may not win the competition,
He'll reap a rich reward from his endeavour
And know, however dingy the surroundings,
A thing of beauty *is* a joy for ever.

A. B.



Webb 0-4-2 *saddle tank shunting engine, the last of a series fitted with Bissel trucks, built by the L.N.W.R. in* 1896—1901

OVERSEAS RAILWAY AFFAIRS

(From our correspondents)

PAKISTAN

New Power Houses on E.B.R.

In accordance with the scheme for electrification of all important stations and depots on the Eastern Bengal Railway, a power house has been built at Bhairab Bazar. It was inaugurated recently by Mr. M. J. Chughtai, General Manager of the Railway. The new plant has a total installed capacity for 90 kW.; it will replace the existing installation set up in 1952 as a temporary measure. The construction of another power house with a total installed capacity of 150 kW. is nearing completion at Akhaura, also on the E.B.R.

INDIA

Diesel-Hydraulic Locomotive Mileage

The 20 Paxman-engined Bo-Bo diesel-hydraulic locomotives operatng on the metre-gauge Kandla-Deesa line of the Western Railway have now aggregated over 1,000,000 miles in service, since being introduced during the period May and October, 1955.

Amenities in Air-Conditioned Class

The Railway Board has decided to provide additional amenities to passengers travelling in the air-conditioned class. In each compartment a stainless steel jug containing drinking water will be provided, and each passenger will be given a separate glass tumbler. In addition, every passenger will be provided with a face towel, and bath towels will be available on request.

Study Tours for Railway Officers

The Railway Board has suggested to the various administrations that steps should be taken to encourage the interchange of ideas amongst their respective officers. Study tours for officers are to be organised on other railways, so that they may observe and imbibe fresh ideas and also impart their own experiences to officers of the railway they are visiting. A suggestion that such study tours should be encouraged was made some time ago by the Estimates Committee of Parliament.

NEW ZEALAND

Further Shunting Power

The last of five 155-b.h.p. two-axle diesel-mechanical locomotives is now on its way to New Zealand from the Stafford works of W. G. Bagnall Limited. These five units, of 20½ tons weight and 9,700 lb. maximum tractive effort, supplement the ten 240-b.h.p. six-wheelers already supplied by the same builder, and are to be followed by two units of about the same output but with a Gardner engine in place of the National engines in the 15 locomotives already delivered. The total number of diesel locomotives now at work or under construction for the New Zealand Government Railways is about 215, ranging from 100 to 1,500 b.h.p., and an enquiry is out for powerful diesel-electric shunters.

Improvement in Railways' Position

Opening a new staff amenities building in the Dunedin railway yards, the Minister of Railways, Mr. J. K. McAlpine, announced that there had been great improvement in the position of the railways in the past few years, and that both freight and passenger traffic were returning to the railways. In less than a year there had been an increase of 72,111 in the number of passengers travelling on South Island railways. The increase in the North Island had been even more spectacular.

The Minister added that an increase was due, no doubt, to the introduction of the railcar. The introduction of diesel-electric locomotives for goods trains had improved the railways service to the public.

Much of the Railway Department rolling stock, Mr. McAlpine went on, had been obsolete, but in the past few years £8 million had been spent on capital development. Thirty diesel-electric locomotives had been ordered in the U.S.A. and 10 1,500-h.p. locomotives from Britain. Forty-two new locomotives were working in the country and shortly the first of 10 Australian locomotives would arrive. Some 2,300 wagons had been ordered from Britain, also 200 insulated vans, each costing £2,000. Railcars cost £47,000 each and there were 35 operating in the country. The Government had also spent £400,000 on railway staff amenities in the past few years. This year another £150,000 had been voted.

ARGENTINA

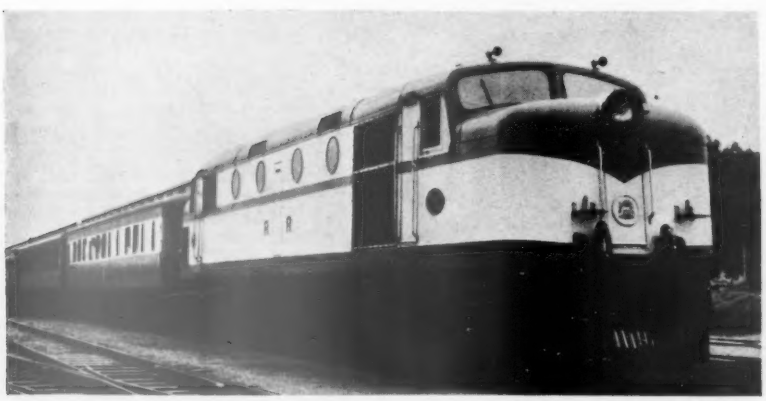
Underground Railway for Rosario

A representative of the Japanese firm of Daichi Busseu Kaisha has visited Rosario to investigate the possibilities of building an underground railway in that city with Japanese capital.

Summer Timetables

Due to a strike in the printing trade, the railways were not able to prepare their summer timetables until the second half of January. These show little difference from those of the previous summer, seasonal services to tourist points such as Córdoba and Mar del Plata, being practically identical.

Diesel-Electric Haulage in Rhodesia



Class DE2 diesel-electric locomotive, built by the English Electric Co. Ltd., hauling passenger train on Salisbury—Umtali section, Rhodesia Railways

UNITED STATES

Checking Splits in Sleepers

The Southern Pacific Railroad now makes a practice of reinforcing sleepers cut from heartwood with steel dowels at their main sleeper plant at West Oakland, California, before they are laid in the track. After seasoning, sleepers pass through the usual boring and incising machines, and then have to pass an inspector, who separates the heartwood sleepers. These are then moved to a machine which bores a pair of ⅝-in. holes into each sleeper at both ends. The drills are then automatically withdrawn and push pins insert threaded steel dowels, 7¾ in. long by ⅞ in. dia., through the sleeper from the opposite side. The dowelled sleepers are then passed to the creosoting plant for the ordinary treatment. Over 60

per cent of Southern Pacific sleepers are dealt with in this way, and the life of many is being considerably extended.

Pennsylvania Public Relations

A novel method has been used by the Pennsylvania Railroad to keep passengers advised as to the necessity for cutting out unprofitable trains so as to reduce the railway's very large deficit on passenger operation. In connection with a petition by the railway to the New Jersey Board of Public Utility Commissioners to permit the consolidation as one train of two services to the Jersey Coast used by season-ticket holders, the railway has been running a cinema coach on both trains in which a 16-min. film has been shown setting out some of the railway's problems, and railway representatives have then asked viewers their opinions of what they have seen, and have discussed any points they have cared to raise. The cinema coach is one so equipped in order to give instruction to the staff in safety and other matters.

SWITZERLAND

German Electric Train Trials

One of the triple-car ET.30 modern suburban and interurban electric trains of the German Federal Railway had a period of test running in February on the lines of the Swiss Federal Railways over the area Bern-Meilen-Rapperswil-Pfaffikon and Winterthur. Because of its 20-ton axleload it was limited in top speed to 125 km.p.h. (77½ m.p.h.). An initial journey was made first from Basle to Zurich for the fitting of an S.B.B. standard pantograph.

Exceptional Load

Transport of a large Brown Boveri turbo-generator set from the B.B.C. works at Munchenstein to Frimmersdorf in Westphalia presented a difficult axle loading problem on the Swiss Federal Railways part of the journey. The direct rail distance from Munchenstein through Basle to the Bädische Bahnhof is under 10 km., but because of rail and bridge loading restrictions the 200-ton group had to be taken south from Munchenstein over the Hauenstein line and then via Turgi, Koblenz, the Rhine bridge at Koblenz, on to the German Federal Railway at Waldshut, and thence to the Bädische Bahnhof at Basle, a distance of 93 miles.

FRANCE

Station Rebuilding at Angers

The passenger buildings at Angers-St.-Laud, seriously damaged during the war, were recently rebuilt in Chauvigny and Migré stone to harmonise with other buildings in the town. The station buildings consist of a central main booking hall and two single-storey wings with baggage rooms, inquiry office, waiting rooms, cloak room and station offices, also a tower, providing on its six upper floor living accommodation for S.N.C.F. staff, and on the ground floor space for a restaurant-buffet.

Low-load Flat Wagons

Besides the low-load flat wagons referred to in our issue of November 9, 1956, the S.N.C.F. recently put on view at Paris-Lyon (Bercy) prototype flat wagons for conveyance of road vehicles. These wagons, which will run in rakes, the extreme ends of which will be equipped with normal height buffer and coupling gear, are equipped with two two-axle bogies fitted with 2-ft. 1½-in. dia. wheels. The floor of this type of wagon, which is particularly low, is suitable for the conveyance of virtually every normal type of road freight-carrying vehicle. The tare weight is 17½ *tonnes*. The wagons will be able to convey a maximum load of 35 *tonnes* at a maximum speed of 62 m.p.h.

Each rake will have normal height buffer and coupling gear at each extreme end, the wagon floor sloping down from these ends to the low-level deck. For loading and unloading, therefore, the train will be split, a mobile ramp making loading practicable on any line to which road access is possible. Special guiding rails are fitted to the wagons and the mobile ramp to ensure that the road vehicles are kept accurately centred on the wagons, thus giving the greatest possible clearance.

Publications Received

Famous Railways of the World. By B. G. Wilson and J. R. Day. London: Frederick Muller Limited, Ludgate House, 110, Fleet Street, E.C.4. 7½ in. × 5 in. 143 pp. Illustrated. Price 8s. 6d.—This work is one of a series, Globe Books, on various subjects and designed for young people; but many adult readers, including railwaymen, will find in it much information of interest. Some 12 railway routes, such as that of the "Simplon-Orient Express" from Paris to Istanbul, or individual railways, such as the Pennsylvania, have been singled out for description to give the maximum variety of interest: the choice is good. The reader is conducted on an imaginary journey over the lines described, which is done with what appears to be a high degree of technical and, where some historical background is desirable, historical accuracy. The photographic illustrations of railway scenes and equipment are well chosen and reproduced and the maps clear.

Civil Engineering—A Creative Career.—A four-page leaflet describing ways of entering the civil engineering profession has been produced by the Institution of Civil Engineers, Great George Street, London, S.W.1, for issue to schools and at exhibitions on civil engineering. Entitled "Civil Engineering—A Creative Career," it has been prepared with the idea that very few young men considering the professions open to them have much idea of the opportunities throughout the world increasingly open to civil engineers, and that this is largely because so little effort has hitherto been expended on informing them. This useful leaflet gives a general outline of the profession and a chart shows four ways of reaching the objective of becoming a Chartered Civil Engineer. The rear cover is a composite photograph showing some British achievements in civil engineering at home and abroad. Copies can be obtained free from the Secretary of the Institution.

Railway Rolling Stock Tyres.—The revised British Standard, B.S. 24: Part 2: 1956, issued by the British Standards Institution dispenses with the practice of allotting specification numbers to individual products. The standard is in two sections, section 1, Locomotive Tyres, previously known as Specification 4, B.S. 24 Part 2, and Section 2, Carriage & Wagon Tyres, previously known as Specification 5 & 5A, B.S. 24, Part 2. Each section includes requirements for quality of material, methods of selection for, and methods of test. An appendix gives details of the form of tensile test piece, which is illustrated; the drop test has been eliminated. As far as possible the contents of the standard have been aligned with current British railways practice. B.S. 24: Part 2, which is part of a general revision of British Standards for railway materials authorised by the Iron & Steel Industry Standards Committee, is obtainable from the British Standards Institution, 2, Park Street, London, W.1. Price 3s. 6d.

Electricity in Industry.—No. 11 of 1956 of *Electricity in Industry*, the technical review of the Lancashire Dynamo group of companies, includes an article described as "a note for management," in non-technical language, and illustrated with photographs and line drawings, on electronic equipment in industry. The review is published by the Lancashire Dynamo Group Publicity Services, St. Stephens House, Victoria Embankment, London, S.W.1.

Churchill Golden Jubilee.—To commemorate the golden jubilee of the firm, the Churchill Machine Tool Co. Ltd., of Broadheath, Manchester, has published the history of the company from its formation in 1906. It is a founder member of the Associated British Machine Tool Makers Limited, formed in 1917. In the following year the demand for Churchill machines increased to the extent that the company purchased the Broadheath site, and erection of the works was put in hand in 1919. From this date, as the book shows, its history is one of continual development: technical advancement, and the production of new plain and universal grinding machines.

British Railways Modernisation Plans for 1957-58

Programme gathering pace: many more diesel and electric locomotives: better freight services: plans under consideration for additional electrification: fast diesel de luxe services from London to Manchester, Birmingham, Wolverhampton, and Bristol

THE programme of improvements and re-equipment to be carried out on British Railways in 1957, with forecasts for 1958, announced in London last week by Sir Brian Robertson, Chairman of the British Transport Commission, shows that the pace of modernisation is rapidly speeding up. More than a third of the total of £1,200 million to be spent under the 15-year modernisation plan is now committed to various developments already in progress or authorised. Large individual programmes of expenditure already authorised include £92 million for electrification, £33·5 million for diesel main line and shunting locomotives, £32·5 million for diesel multiple-unit trains, and £46 million for major works such as track widening, new junctions, and station and depot reconstruction schemes.

Freight Traffic

Measures for the more efficient movement and handling of freight traffic will gather increased momentum in 1957-58. Rapid progress is expected, for example, with the programme for installing the continuous automatic vacuum brake on all freight wagons, which will greatly speed-up the transit of goods and mineral traffic. In addition to equipping all new general merchandise wagons and 25,000 existing wagons, some 6,000 new 16-ton mineral wagons will be fitted in 1957, after which all wagons built will be fitted with continuous brakes. The 1958 programme also covers the conversion of about 80,000 existing wagons. It is still too early to give an exact estimate, but it is hoped to complete the programme in less than the 10 years originally planned. Other features, related to the general adoption of vacuum brakes, which are now being closely studied include the development of an automatic coupler for vacuum-braked wagons and brake maintenance and testing facilities. The heavier wagons are being fitted with roller-bearings or other improved axleboxes.

Tests have confirmed the possibility of improving the release times with the vacuum brake by streamlining the train-pipe system, and the design and manufacture of prototype valves to improve the performance of the existing form of direct admission valve has been completed. A system embodying the use of these valves will be fitted to a wagon shortly, and if successful, will then be applied to a complete train for extended trial.

Deliveries of new freight and service vehicles and containers are expected to include 69,000 freight and service vehicles in 1957 and 40,000 in 1958. In 1957, 7,480 new containers should be built, to be followed by 6,200 in 1958.

Some £730,000 will be spent on schemes for improved wagon repair depots, already authorised, at Chester, Simonside (Tyne Dock), and Townhill Junction (Fife). Schemes for York, Shildon, and Port Talbot, costing in all about £800,000, and now under consideration, are also expected to be under way by the end of 1958.

A number of important schemes for new or improved marshalling yards, relief lines, and freight terminals will be launched or carried forward in 1957-58. A special feature will be the construction of flyovers to relieve congestion at several busy traffic centres. A start will be made in 1957 with the construction of a flyover bridge south of Bletchley station, Bucks, at a cost of some £1,600,000. The flyover at Bletchley forms part of a wider plan for diverting cross-London freight traffic to routes which avoid the congested London area altogether.

A new flyover is also to be provided at Rugby at a cost of £870,000. This will obviate conflicting movements at the junction immediately north of the station, which will increase with the introduction of the more intensive main line electric service between Euston, Manchester, and Liverpool. This work will be started in 1958, when it is also expected to put in hand the construction of a flyover at Euxton (between Wigan and Preston)—estimated to cost £320,000—where similar difficulties arise from conflicting movements.

New connections are to be provided at Fenny Compton and Stratford-upon-Avon between the former G.W.R. and L.M.S. lines, which, in conjunction with new sidings at Honeybourne, will reduce congestion and enable traffic to be worked more economically. A new double-track connection between Craiglockhart and Slateford (Edinburgh), to cost £700,000, will be started in 1957.

In 1958, it is proposed to undertake the completion of the four tracks between York (Skelton) and Northallerton in the North Eastern Region, by the construction of an up slow line from Pilmoor to Alne. Colour-light signalling will be installed on the slow lines between Pilmoor and Thirsk. This will facilitate the working of traffic over the main line and will make possible the diversion to the main line of freight trains from the Leeds-Harrogate-Northallerton line, over a section of which two engines are required.

Important projects in South Wales recently have been approved at a cost of nearly £2 million. The capacity of the line between Pyle West Junction and Briton Ferry is nearing saturation point, and increased traffic will be arising in the near future from the developments of the National Coal Board and the Steel Company of Wales. Multiple-aspect signalling will be provided throughout the area, with two-way working through Port Talbot (General) station, which will be reconstructed. In connection with the National Coal Board developments at Cynheidre, Carmarthenshire, the output of some 400 tons of coal per day in 1958 will progressively increase to 4,000 tons, and substantial engineering works will be necessary on the Llanelly-Mynydd Mawr branch. Both these works will be put in hand in 1957.

Good progress is being made with the schemes for new marshalling yards at Temple Mills, Ripple Lane (Barking), Edinburgh (Millerhill), and work in connection with a number of other

PASSENGER AND FREIGHT VEHICLES SCHEDULED FOR CONSTRUCTION IN 1957

Passenger Carriages			Non-passenger coaching stock	Wagons	Containers	To be built at
Locomotive hauled	Multiple-unit diesel	Multiple-unit electric				
	281			4,450		Derby
250				2,500	730	Wolverton
			70		2,400	Earlestown
70			20			Doncaster
200						York
				7,700		Shildon
			150	3,450	740	Faverdale
80	98		50	1,500	450	Swindon
	126*	230			100	Eastleigh
				4,300		Ashford
				200		Lancing
					400	Cowlairs
			45		500	St. Rollox
600	505	230	335	24,100	5,320	Total, railway workshops
700	575		105	44,900	2,160	Contractors
1,300	1,080	230	440	69,000	7,480	—

* Diesel-electric

yards will be put in hand in 1957-58. At Perth one new yard will be provided in place of four; the work of 13 existing signalboxes will be concentrated into one central power box, together with the introduction of colour-light signalling.

Work is expected to start this year on the second stage of the new marshalling yard at Port Talbot to cost nearly £2 million. The provision of additional facilities at Severn Tunnel Junction will begin next year.

A start has been made on a new goods yard to serve Crawley New Town and on modernisation of the goods depots at Lincoln, Liverpool (Spekeland Road), and Ripple Lane (Barking). At Peterborough, construction of a new goods depot north of the passenger station—an essential preliminary to rebuilding the latter—will start this year at a cost of £408,000. Sheffield (Queens Road) goods depot is to be rebuilt to enable it to deal with sundries traffic now handled at three depots; the scheme will start this year and will cost £1,250,000, but will produce substantial savings. A scheme has also been authorised for a new modernised goods station at Sighthill (Glasgow) at a cost of £2,250,000, to enable traffic to be concentrated at two main terminals instead of three.

Further Electrification

Altogether, some £92 million has now been authorised on the electrification of British Railways. It is expected that the expenditure to be incurred on these electrification schemes, excluding the provision of new rolling stock, will amount to some £7·5 million in 1957 and £11·5 million in 1958. Expenditure of the order of £16 million will be incurred on new electric locomotives and multiple-unit coaches for electric trains. By 1958, 20 electric locomotives will have been acquired and 230 further multiple-unit coaches will be introduced in 1957 and 800 the year after.

The Commission considers that it should be possible to complete well before 1970 most of the electrification projects included in the plan and already announced. There should thus be the capacity to undertake additional electrification during the later 1960s, and consideration is now being given to further schemes.

As regards the progress during 1957 of electrification schemes already announced, planning for the electrification of the line from Fenchurch Street to Tilbury and Southend is continuing. Work is starting this year, and will be finished next year, on the electrification of the lines from Colchester to Clacton and Walton.

Preliminary work on track, bridges, and telecommunications is in progress in connection with the electrification of the Manchester-Crewe line. This pilot scheme for the electrification of the main lines between London, Birmingham, Liverpool, and Manchester is provisionally estimated to cost £10 million and is programmed to be brought into operation in 1959. Some £1·5 million will be spent in 1957-58 on Stage I of the Glasgow suburban electrification (Airdrie-Helensburgh including Milngavie and Balloch Pier; Cathcart Circle; Cathcart East Junction to Kirkhill and Neilston High); it is expected that these works will be completed in 1962.

In 1957-58 some £7 million will be spent on Stage I of the scheme for the extension of the Southern Region electrification, covering the lines from Gillingham, Maidstone East and Sevenoaks to Sheerness, Margate, Ramsgate, Folkestone, and Dover.

Diesel Trains

A scheme has been approved for the construction of five diesel-electric de luxe trains to operate between London and Manchester (London Midland Region); between London, Birmingham and Wolverhampton; and between London and Bristol (Western Region). These trains, which will be put into operation in 1958, will set new high standards of service for British Railways. Meals will be served at all seats. Twenty-two lightweight diesel railbuses are being ordered, for delivery in 1957 and 1958, for experimental use in rural areas in the Eastern, London Midland, Scottish, and Western Regions.

The first 50 of the 230 diesel mainline locomotives now on order or authorised, at a total cost of £16 million, are expected to be delivered in 1957 and more than 100 in 1958. Supplementary programmes for 1958 are being considered. Some 550 shunting locomotives are now in service, and it is expected that a further 500 will be delivered in the two years under review. More than 1,000 vehicles for use in multiple-unit diesel trains—which have proved outstandingly successful on suitable routes and services—are expected to be delivered in 1957, and over 1,200 in 1958.

Passenger Stations

Among passenger stations where major improvements are already in hand are Barrow Central, Cannon Street and Euston (London), Banbury, Glasgow Central, Weymouth and Plymouth North Road. Other stations to be started in the next two years include Chichester, Manchester London Road, Macclesfield Central, Stoke, Liverpool James Street, Birkenhead Hamilton Square, Coventry, Sunderland, Leeds City, Crawley, Gatwick, Port Talbot, and Bank (Waterloo & City Railway). Schemes are also being prepared for stations to serve the new towns at Harlow and Basildon, and for the modernisation of Parkeston Quay station.

Substantial progress will be made with a new track layout and the installation of modern colour-light signalling at Manchester Victoria. In conjunction with this scheme, improved station accommodation will be provided.

Increased mileage of permanent way renewals is being included in the annual programmes, and additional provision is being made each year for deep ballasting and formation strengthening to cater for increased speeds.

In the Southern Region, work will start in 1958 on the re-arrangement and re-alignment of the track in the Shortlands and Bickley areas, at a cost of £900,000, to enable speed restrictions to be eased. Work is in progress on the three new tunnels between New Barnet and Potters Bar (Kings Cross main line), and it is expected that a start will be made in 1958 with the provision of additional running lines at other points on this route.

DIESEL AND DIESEL-ELECTRIC PASSENGER VEHICLES AUTHORISED

	Mechanical transmission	Diesel-electric	Total
Built up to end of 1956 ..	423	—	423
Expected in 1957 ..	954	126	1,080
Remaining for delivery in 1958 ..	1,190	56	1,246
Total	2,567	182	2,749

By the end of this year contracts totalling more than £8 million will have been placed for signalling installations. Among major re-signalling schemes, colour-light signalling is to be installed at St. Pancras at a cost of £294,000, and will be largely completed in 1958. The new signalling at Newcastle, involving the replacement of three signalboxes by a single box, will also be completed in 1958, as will a scheme of colour-light signalling at Huddersfield. Other important signalling schemes are at Glasgow Central (to start 1957); Birmingham Snow Hill, which is expected to be completed in 1959; and, in connection with the installation of multiple-aspect colour-light signalling between Paddington and Southall, the concentration of signalling at Old Oak Common in one signalbox, and similarly at Acton.

Schemes are being prepared for colour-light signalling between Newcastle and Berwick, and between Bentley and Leeds (North Eastern Region), at a cost of some £3 million. It is expected that work will start on these in 1958. A scheme for centralised train control between Perth and Inverness (Scottish Region), at a cost of some £1 million, is also under consideration.

Detailed planning is well advanced in connection with the extension, to be completed by 1962, of the British Railways standard system of automatic train control to five principal main line routes: from Kings Cross via Newcastle to Edinburgh; Euston to Glasgow (including Manchester and Liverpool); Edinburgh to Glasgow; Waterloo to Bournemouth and Exeter; London Liverpool Street to Norwich. The tooling-up of workshops for the manufacture of A.T.C. components will be taken in hand shortly and installation will begin as soon as production has started. The rate of installation and fitting to locomotives will not be very high in 1957-58 but will build up in subsequent years.

Scottish Region Track Maintenance

Installation of mechanically-operated ballast cleaning and tamping equipment

End view of machine, showing waste conveyor in operation

MECHANICAL aids for permanent way maintenance as a means of saving labour, and speeding up the work, are being increasingly used by railway administrations generally. The Scottish Region of British Railways has put into service a ballast cleaning machine which is capable of screening from 80 to 200 yd. of track an hour. The machine is the 3B5 type supplied by Matisa Equipment Limited, and is one of several designed by the firm, all of which operate on the same principles. Basically the equipment consists of a continuous excavating chain circulating around a triangular guide frame, and which passes beneath the track and excavates the shoulder, crib, and under sleeper ballast in one operation. This chain elevates and loads the excavated material on to a conveyor system, which in turn carries it to a bank of vibrating screens. From these screens the good ballast is conveyed back to the track, and the waste screenings are elevated to wagons or dumped on the side of the track. In the case of the present 3B5 machine under discussion, waste is discharged into trucks on the adjacent track.

Robust Construction

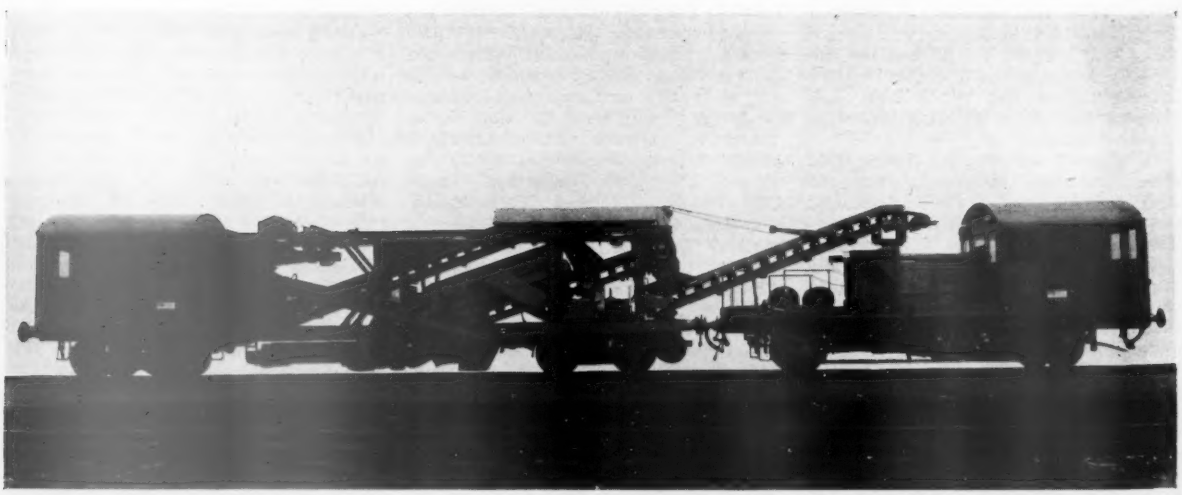
The 3B5 machine is a self-propelled unit powered by a Leyland diesel engine of 150 h.p. and can travel either in normal train make-up, or at a speed of 25 m.p.h. under its own power. The machine, which is fabricated from heavy steel section and plate, is over 80 ft. long and weighs 55 tons. It is comprised essentially of two units, the first consisting of the excavator and screening mechanism called the machine wagon. This unit is carried on two two-axle bogies, the framework consisting of heavy steel sections with ample bracing. Both bogies are of normal construction.

The second unit, or power wagon, is a two-axle vehicle containing the diesel generator set which supplies the power required by the various electrically-powered units of the machine wagon, and also its own traction needs. The power wagon, in effect, is a useful locomotive in itself. The essential riddling process on the Matisa ballast cleaner is effected by a screening unit comprising a bank of three different mesh grids which are continuously vibrated. Ballast is thus not only screened, but graded, and facilities exist for the return of graded ballast direct to the track, immediately behind the cutter bar. Ballast return is also effected from a centrally-positioned distributor conveyor. Alternatively, screened ballast may be dumped in windrows, as required.

Depth of Cut

Each operational facility provided by the machine is individually powered by its own electric motor. Depth of cut may be adjusted by means of a simple screw control, centrally placed either side of the machine. Speed of advance is controlled by the cable and winch drum method, the cable being anchored to the track ahead and the winch winding in the cable.

(*Continued on page* 312)



Matisa ballast-cleaning machine type 3B5. *Equipment is in position for travelling to site*

ELECTRIC RAILWAY TRACTION SECTION

Dual-Frequency Locomotives

WHEN the French National Railways 50-cycle electrification is extended from Strasbourg to Basle in the course of this year, it will link up with the 16⅔-cycle a.c. system of the Swiss Federal Railways. Certain tracks in the area of Basle S.B.B. station will be equipped with an overhead line which may be connected to either supply, but only limited inter-running is possible in this way and there are circumstances in which it will be convenient to have greater flexibility of movement. For this reason the S.N.C.F. ordered four dual-frequency locomotives from Swiss builders in 1955. Two of these prototypes will be equipped by Oerlikon with a.c. series motors, and the others by Brown-Boveri with rectifiers and d.c. motors. In designing the electrical equipment it was necessary to take account not only of the two frequencies but also of two voltages, the French and Swiss supplies being respectively at 25 kV. and 15 kV. To some extent, therefore, the problem has features in common with the dual-voltage requirement of electrical equipment for the British Railways 50-cycle scheme, but with an added complication.

An article in the February issue of *Electricité* by Monsieur M. Gaide, of the Electric Traction Development Division, S.N.C.F., describes the alternative methods studied for meeting the situation. One possibility was to provide for the two voltages by means of an auto-transformer with alternative connections to the primary, as is being done in designs in this country for 50-cycle locomotives. At 16⅔ cycles, however, the secondary voltage for a given induction is only a third of what is obtained at 50 cycles, and to compensate fully for this effect an undesirably large and heavy transformer would have been required. The scheme was therefore felt to have the disadvantage of introducing switching of the high-tension input to the locomotive while still involving a reduced output when running on the lower frequency. It was therefore decided to adopt a single connection to the primary for either voltage, and to make the transformer of such dimensions as to allow for the higher induction on 16⅔ cycles. At this frequency the secondary voltage on open circuit is reduced by 40 per cent compared with that at 50 cycles, but this is compensated by the lower inductive voltage drop on load, so that the performance of the locomotive remains acceptable for the restricted running which is required on the low-frequency system at present. The transformers constructed on this principle will weigh 12¼ tons as against the 10 tons of a corresponding transformer for 50 cycles only. In the two locomotives with rectifiers, provision for low-frequency working will also increase the size of the smoothing chokes, the weight of which will be 20 per cent higher than for 50-cycle chokes. The a.c. series motors of the other two locomotives will have two forms of interpole shunting, a plain resistance being used on 50 cycles and a resistance and inductance in parallel on 16⅔ cycles.

Special consideration was given also to the method of driving auxiliaries, and here it has not been possible to avoid switching to adapt the circuits for a supply from either line voltage. In the locomotives with 50-cycle motors, however, this will be required only in connection with the supply to the induction motor driving the pump for circulating the transformer cooling oil, since the other auxiliaries will be driven by series commutator machines which, because of the reduced inductive voltage drop on 16⅔ cycles, will operate satisfactorily in spite of the lower line voltage associated with that frequency. Auxiliaries in the rectifier locomotive will be fed through dry-plate or subsidiary mercury-arc rectifiers, the supply to which will be switched between alternative tappings on the main transformer tertiary winding according to the line voltage. These changes will be initiated by feeler relays, similar to those to be used in British Railways locomotive and motor coach equipments, which will detect the line voltage in use. The fixed input to the main transformer, which has been mentioned already, will make it unnecessary to provide for similar automatic switching on the high-tension side, as is being done in the British Railways schemes, and the tripping and resetting of the main circuit-breaker when passing from one supply to the other will be carried out by the driver. At present it appears that such changes of supply will occur only in shunting or short-distance running, and manual control may well prove satisfactory.

It has been proposed, also, to use dual-frequency locomotives for certain through workings over the line between Pontarlier and Les Verrières, which has been electrified on the Swiss 15-kV., low-frequency system. This section will shortly be linked by the S.N.C.F. 50-cycle electrification now in progress with the 1,500-V. d.c. system at Dôle, and the use of dual-frequency motive power will avoid the need for changing locomotives both at Dôle and Pontarlier. Here, again, only a short distance and a limited number of trains is involved, so that the advantage of simplicity inherent in the system described will offset the lower performance on 16⅔ cycles. It may prove advantageous for locomotives to make long runs over lines with a different electrification system from their own; Monsieur Gaide quotes the weight of a transformer to give similar performance on the two frequencies as being about twice that of a transformer for 50 cycles only.

Regeneration in Suburban Working

EXPERIMENTS with regenerative braking on urban or suburban railways have led generally to the conclusion that useful recuperation of energy could be achieved but would not always justify the special measures needed to handle the power returned in this way. There is general agreement on the savings in wear of brake blocks and maintenance of electrical equipment secured by electric braking in any form, so that special interest attaches to a system which attains this result while also offering a solution to the problem of accepting regenerated current in all circumstances. These features are found in the regenerative equipment now in use on the Poppenbüttel to Blankese line of the S-Bahn in Hamburg, which is described in an article on another page by Professor Dr. Alfred Kniffler, who has been responsible for promoting its development and for a test programme from which data of great value to electric railway operators have been obtained. The system combines regenerative and rheostatic braking, the latter being brought into use automatically, irrespective of speed, if the line is non-receptive to regenerated power. Rheostatic braking takes over in any case as speed falls below 24 m.p.h. and may continue to a standstill, but from 9 to 12 m.p.h. the air brake is used as well and when the brake cylinder air pressure exceeds a certain figure the electric brake is cut out to avoid locking of the wheels. In its combination of regenerative, rheostatic and air braking, the system recalls the modifications recently carried out in the braking scheme of electric locomotives on the Manchester-Sheffield 1,500-V. d.c. electrification, but here surplus power is dissipated in substation resistors. The use of resistances on the vehicles for this purpose might be practicable on other electrified lines where the braking period is short, unlike conditions on the Manchester-Sheffield line. Various manufacturers have been participating in regenerative braking experiments on London Transport tube stock. Prewar trials with the Metadyne stock on surface lines were not carried to the point of elaborating methods for disposing of regenerated power in non-receptive conditions, but there has been further progress since that time in the use of rectifiers as inverters for feeding current back to the three-phase supply.

Contact Lines for Electric Traction

Information supplementing that contained in the article in issue of January 18, 1957

By Matthias Wittgenstein, Dipl.Ing., Kummler & Matter A.G., Zurich

OVERHEAD contact lines generally used consist of a contact wire suspended from a catenary by means of vertical hangers, and laterally fixed to the suspension points. To ensure the carbon of the pantograph being worn down evenly, the wire is strung zig-zag, so that it alternates from one side of the pantograph to the other. On the basis of calculations, taking into account both traffic density and weight of trains, the following copper cross sections were arrived at:

Main cantenary for through main stretches	0·101 sq. in.
Main cantenary for sidings	0·082 sq. in.
Contact wire for through main stretches	0·166 sq. in.
Contact wire for sidings	0·14 sq. in.

As not only the catenary, is included in the electrical cross sectional area, the hangers already mentioned must be electrically conductive. The maximum travelling speed for which the contact line must be built has been specified by one important authority as 100 m.p.h.

If a cable or wire is suspended at two points with a horizontal mechanical tension, it forms a curve shaped almost like a parabola. If the points of suspension are at equal level, the greatest sag is equidistant from both points, and the horizontal mechanical tension is equal at every point of the cable. Along the curve made by the cable, the vertical weight component bearing down each part of it is greatest at the suspension point—where it is equal to half the weight of cable or wire—and zero in the centre of the span between two poles.

A pantograph of the design generally used today exerts an upward force on the contact wire amounting to from 12 to 24 lb., which causes the contact wire and the catenary to be lifted from the normal position to the working position. The pantograph will raise the wire higher in the middle of the span than under the suspension points, which means that the contact line is elastic at the centre of the span, but remains practically rigid at the suspension points, as shown in Fig. 1. These various degrees of elasticity between suspension point and span centre must be prevented by suitable structural measures, to enable the pantograph to run along at the same level without any appreciable change caused in the contact pressure. The pressure of the pantograph lifts the contact wire and the bend or wave, flattens out again at some distance before and after it, see Fig. 2, and, when it is in motion, accompanies it continually. To ensure continuous spark-free current collection and uniform contact pressure, this travelling wave must never be interrupted. The higher the speed of the pantograph, however, the more do additional weights on the wire, e.g., hanger clamps and pull-offs (side-holders) at the suspension points, make themselves noticeable through increasing mass inertia in the form of so-called hard points which interfere with, or deform, this wave and cause irregularities in the contact pressure; even sparking in extreme cases. The weight of the hanger clamps and pull-offs must consequently be kept to a minimum, and correctly suspended.

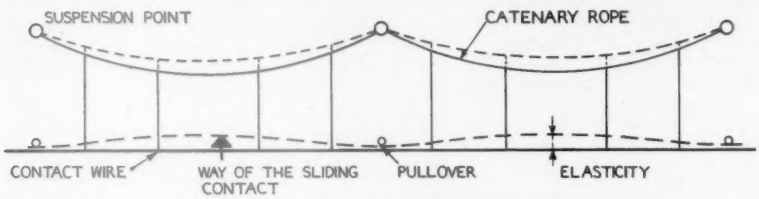


Fig. 1—Normal and working position of the contact wire and cantenary

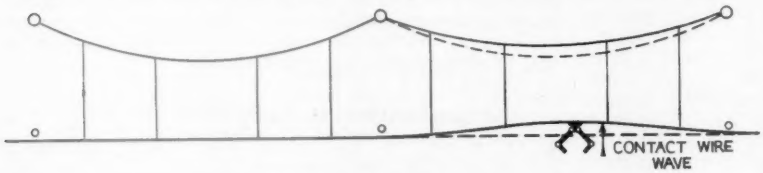


Fig. 2—Contact wire wave

A phenomenon in connection with this wave action is the fact that the upward bend of the contact wire is more pronounced at low than at high speeds, during which the mass inertia of the contact wire gradually increases. This effect of the contact line elasticity decreasing as the pantograph speed increases is compensated by the raising of the contact pressure by the slip stream.

With a knowledge of the dimensions of the sliding collector piece, the lateral wind pressure, the reduced mass inertia of the pantograph and the contact pres-

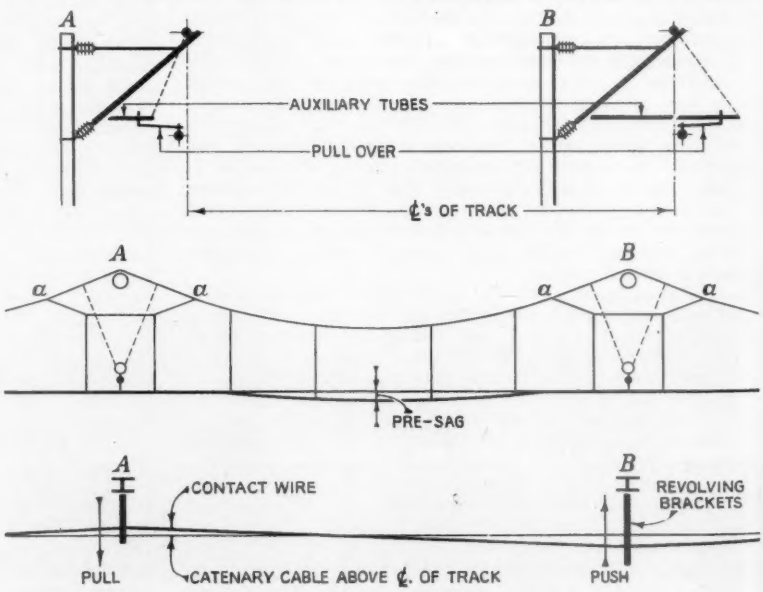


Fig. 3—Arrangement of suspension

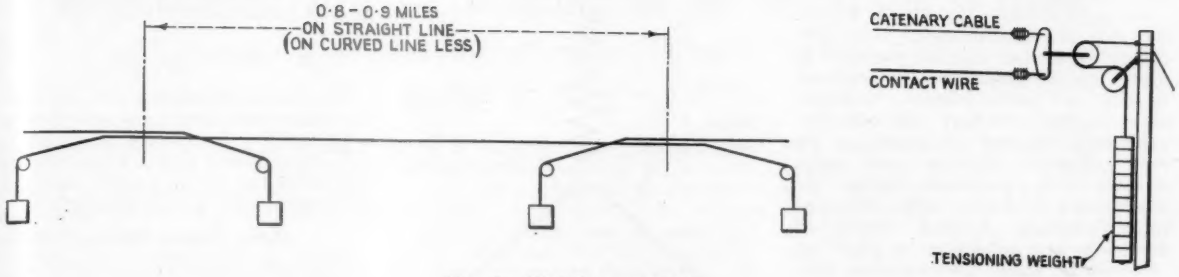


Fig. 4—Weight tensioning

sure, the engineer first determines the distance between two poles and then calculates the elasticity. On the basis of these calculations, the mechanical tensile forces exerted by the catenary cable and by the contact wire, are equated to one another, and the distance between the hangers established. On this calculation depends the extent to which the elasticity of the contact wire must be increased artificially at the suspension points. Contact lines meeting the high demands made by main line working will most likely require a somewhat more expensive construction than would suffice for those for lower speeds. The length and the prestress of the auxiliary catenary are determined from the elasticity calculation.

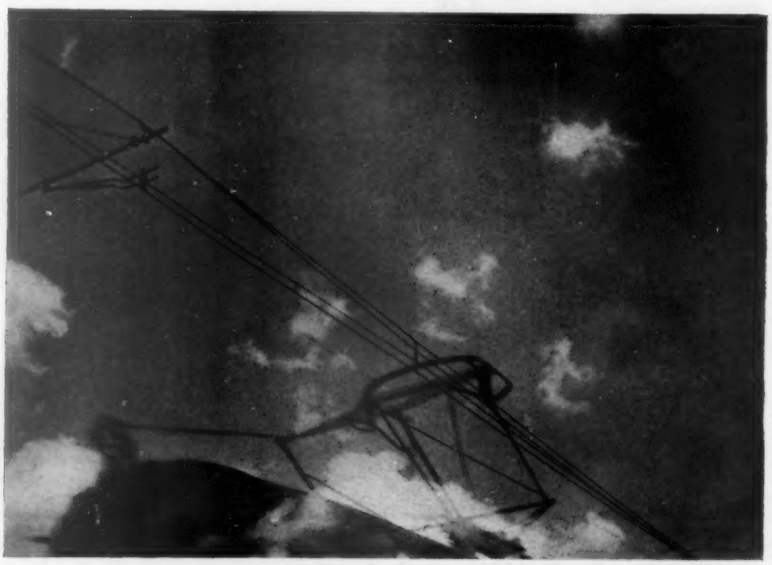
Two hangers are attached, as shown in Fig. 3, to the auxiliary catenary, one before and one behind the pull-over, whereby the elasticity of the contact wire is artificially increased at the suspension point. The zig-zag of the wire in relation to the poles results in a pull on the suspension at one pole A and a push at the next B. Since a side-holder in tension produces a different elasticity from one in compression, it is found necessary to employ what is called the auxiliary tube. This is suspended by two hangers in a V-shape directly from the catenary, and consequently always participates in the temperature-responsive rotations of the brackets. Furthermore, the use of this auxiliary tube enables making the pull-offs at alternate poles short, light, and of equal length; this results in uniform elasticity in spite of the variations in stress due to the zig-zag. The greater elasticity of the contact wire at the span centre is additionally compensated by providing somewhat longer hangers there, producing a pre-sag of the wire at this centre part, as shown in the figure.

Mechanical Tensioning

Contact wire and catenary cable are subject to temperature-responsive changes in length that affect the sag between suspension points and thereby also the path of the pantograph. On the Continent one still frequently finds contact lines with rigidly strung catenary and a contact wire tensioned by weights. Such forms of construction do not, however, ensure satisfactory contact conditions at speeds of 75-80 m.p.h. or more. The latest specifications require that both catenary and wire be tensioned so as to ensure the same mechanical tensions throughout the year resulting in uniform sag and elevation of the contact wire. The mechanical tensioning devices are located along the open stretches 0·8 to 0·9 mile apart, as shown on Fig. 4, and as far as possible should not be located in curves. Exhaustive measurements have shown that high mechanical tension of the contact wire results in more favourable contact conditions and better running of the pantograph, but it can have serious consequences, since the lateral stress exerted on the poles and concrete foundations is also increased, involving considerable extra expense.

An intersection of two wires and also any transition from one length to another in the case of mechanical tensioning constitute particularly difficult problems. The moment the pantograph meets a second contact wire at an intersection, it has to lift double the weight of wire, but since the contact pressure remains constant, the pantograph is pressed downward, and this interferes with the desired horizontal run and, at the same time, with the constant pressure of the sliding piece. In this case, too, the elasticity of the contact wire has to be artificially enhanced by a suitable V-shaped suspension of the parts of the contact wire adjoining the point of intersection. The best contact conditions result in the minimum of wear on the contact wire and sliding-contact carbon, because such is directly proportional to the degree of irregularity in contact pressure.

Tests have been carried out by all railway managements using electric overhead contact lines, which have compared the different types of design and construction. Graphs have been drawn showing simultaneously the positions of the points where the pantograph breaks contact with the line and also its up-and-down motion at different speeds. Attempts to measure the contact pressure itself by suitable instruments have so far been without result; the dead weight of such apparatus, which has to be attached to the sliding piece of the pantograph, invariably distorts the results. A simple method of finding the elasticity of a contact line is to use a film to photograph it at rest and again by a second exposure, when the pantograph is travelling along. In the photograph reproduced below is seen the difference in elevation between



Normal and working positions of pantograph

the normal and working positions.

As most railways were built without thought of electrification, alternative designs of contact line are required to meet special conditions in stations, tunnels, and under bridges. Compromise is often necessary and extensive experience required to arrive at the most efficient solution. At large stations with electrified sidings the whole network moves under temperature variations. A great amount of designing and planning is therefore unavoidable, while cost, of course, must be kept within a reasonable figure. Appearance is a matter of taste, but as a rule the most efficient contact line also is the best looking.

Mass Inertia of Pantograph

In the previous article in our issue of January 18, 1957, where a form of pantograph designed by the Vienna works of Siemens-Schuckert was illustrated, the general characteristics of pantograph construction, as they affect an efficient contact line, were discussed and stress laid on the importance of sound mechanical design, the breadth and shape of the contact piece and other factors. The ability of the sliding piece to accelerate vertically was emphasised and for this the mass inertia must be reduced at point A in Fig. 5. A theoretical calculation is very difficult to make, as inaccuracies in bearing friction cannot be exactly allowed for. Fig. 5, however, shows a comparatively simple method of arriving at what is desired. Spring S, which provides the contact pressure, is removed and the pantograph suspended at A by a coil spring. Its effective weight is measured and also the extension x of the coil spring between loaded and unloaded positions. Point A is then made to oscillate vertically and the frequency f noted. The reduced mass inertia may then be found from

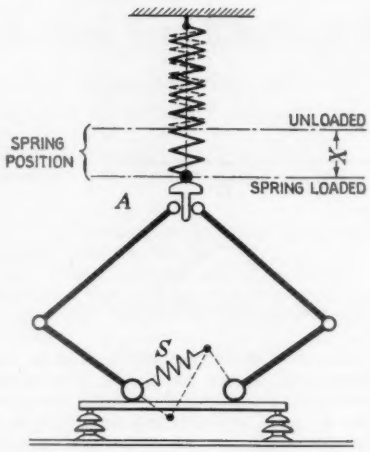


Fig. 5—Influence of mass inertia

$$m_{red} = \frac{wg}{4\pi^2 \cdot x \cdot f^2}$$

The contact pressure is then the product of the mass inertia and acceleration and the ability to accelerate at point A may be calculated with a knowledge of such pressure, giving a simple method of comparing designs of pantograph.

Other Considerations

As pointed out in the previous article, a pantograph is subject to heavy mechanical stresses at high speeds and must possess great lateral stability. The slip stream—particularly the up stream of air from the front end of the locomotive—creates undesirable additional contact pressure and therefore in some countries only the rear one of the two pantographs is in use at one time in order to reduce this unwished for effect. Action on the contact line also is simpler under these circumstances. It is unnecessary here to repeat what was said in the previous article regarding the planning of a contact line system and the numerous factors that require to be taken into account to achieve a thoroughly satisfactory result, in which process practical experience has to come largely to the aid of theoretical knowledge, in view of the complicated nature of the conditions involved.

Electric and Diesel Working in the Eastern Region

Down train entering Wickford Junction, on the recently electrified Shenfield to Southend line (see our issue of December 28, 1956). In the bay platform is the twin-car diesel set working the Southminster branch

Regenerative Electric Braking on the Hamburg S-Bahn

A study of the possibility of current saving in intensive traffic

By Professor Dr. Alfred Kniffler

THE Hamburg system of urban and suburban railways ("S-Bahn") operated by the German Federal Railway comprises several routes with an aggregate length of 88 miles. The sections from Poppenbüttel to Blankenese and from Blankenese to Wedel are electrically operated, and the section from Hamburg Hauptbahnhof to Bergedorf is at present being converted to electric operation. The most important section is Poppenbüttel to Blankenese, and the inter-station distances and other characteristics of this section have governed the design of the multiple-unit trains and their power rating. Before describing the special features of the electric regenerative braking system, it would appear desirable to give a few particulars about this section and its current supply as well as the multiple-unit trains used. The results of the electric braking system, and particularly the regenerative braking, can only be properly appraised if one is familiar with the characteristic features of vehicles and line.

The line from Poppenbüttel to Blankenese has a length of 20 miles. There are 23 stations, spaced at intervals which vary between 2,300 and 7,200 ft. There are no very steep gradients. Altona is a terminal station.

The traction current for this line is supplied through eight substations. Seven of these are of a standard type, each being equipped with three water-cooled, 2,400-amp. rectifiers. The eighth substation, Poppenbüttel, is of the auxiliary type with one pumpless air-cooled 2,000-amp. rectifier equipment. The distance between the standard substations varies between 1.6 and 2.9 miles. The nominal d.c. voltage is 1,200, the running rails being connected to the cathode and the current rails to the central point of the rectifier-transformer. The 25-kV. three-phase current is taken from the grid of the Hamburg Electricity Authority and fed into the S-Bahn cable system at two points.

For the proper appreciation of the regenerative braking system, it is important to know that special switchgear has been installed at a point between any two adjacent substations which permits the connection, in any desired combination, of the four feeder sections meeting at that point. As is well known, this measure tends to reduce the voltage drop during the acceleration of trains. The arrangement is of equal importance to regenerative braking as it facilitates the disposal of the regenerated energy. The current rail itself is of iron of low carbon content, the cross-sectional area being 5,300 sq. mm. (8¼ sq. in.).

The rolling stock consists of semi-permanently coupled three-car units. The end cars are motor coaches, each with four motored axles. The intermediate coach is a trailer. Each of the eight motors of a three-car unit has a one-hour rating of 145 kW. at a speed of 17 m.p.h. As far as the actual running of the trains is concerned, a motor power of 110 kW. would have been adequate. The remaining 35 kW. are required because of the greater strain on the traction motors due to the electric braking. The two traction motors of each bogie are permanently connected in series. During the start, the normal series/parallel connection is used. There are 67 of these three-car units.

Speed/Time Diagram

In examining the possibilities of making use of an electric brake, especially in the range of regenerative braking, it is important to study the speed/time diagram. The strain on the electrical equipment during running and braking as well as the quantity of energy to be regained are governed by the relation between the speed at the moment when current is switched off and the speed at the moment when braking is due to begin. Fig. 2 shows the speed/time diagram for a scheduled run over the average stop-to-stop distance of 1,480 metres (4,855 ft.). It will be seen that the traction current is supposed to be cut off at a speed of 37 m.p.h. Braking is initiated at 33

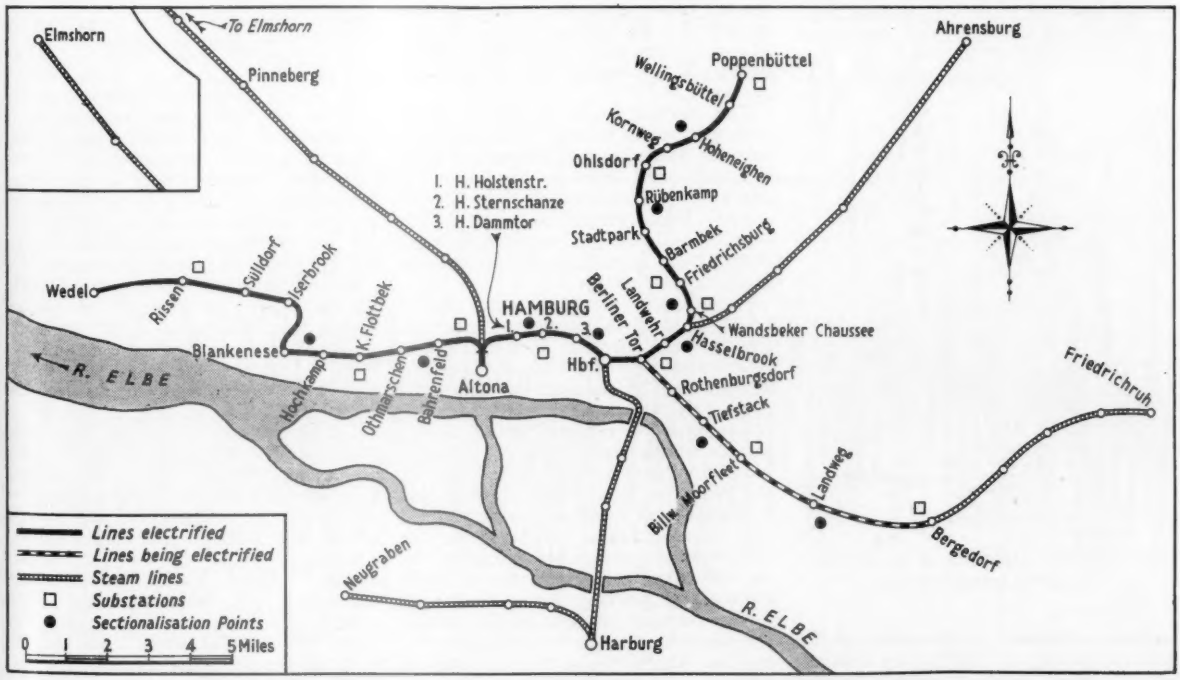


Fig. 1—Map diagram of Hamburg S-Bahn, showing location of substations

m.p.h. The mean running time over such a distance of 4,855 ft. is 117 sec. The average time of the subsequent station stop is 24 sec.

Electric Brakes

The electric brake of these multiple-unit trains is a combined regenerative and rheostatic brake. During each braking operation, the possibility of

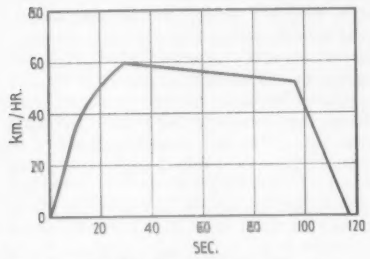


Fig. 2—Speed/time diagram for a scheduled run over the mean distance between stops of 4,855 ft.

returning current to the live rail, i.e. the possibility of regenerative braking, is automatically checked. If the relevant conditions are not fulfilled because the current rail cannot absorb the current, or because the speed at which braking is initiated, is too low to overcome the counter-voltage of the live rail, rheostatic braking is automatically substituted.

The electric brake works with

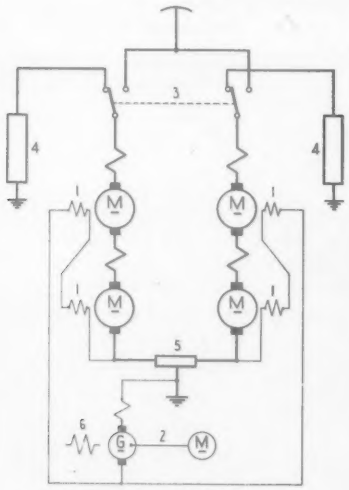


Fig. 3—Power diagram of regenerative and rheostatic brake

external excitation, as the fields of the traction motors are fed, during braking, by a special motor-generator exciter (Fig. 3). To obtain the desired degree of uniformity in retardation over a great speed range, compound resistances are switched into the armature and exciter circuit of the traction motors (brake generators). The driver can, through regulation of the external excitation of the exciter, choose between two basic rates of braking, one for full and the other for, say, half that power.

Fig. 4 shows the brake power characteristics for a multiple-unit train. In the higher speed range, the characteristics of the regenerative brake and of the rheostatic brake are very similar, supplying a nearly constant brake power. Below 24 m.p.h., the brake power of the regenerative brake drops rapidly until it becomes zero at 18 m.p.h. Below the zero line, the characteristic enters the motor range. As regeneration is of little use at speeds below 24 m.p.h., the brake control circuits are automatically switched over by the falling current to rheostatic braking. This is maintained until the train comes to a stand; below 9-12 m.p.h., however, the driver uses the air-brake as well. In order that the axles shall not be locked, the electric brake

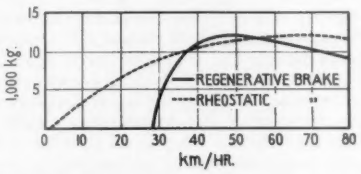


Fig. 4—Brake power of a multiple-unit train as a function of speed

switches itself off automatically when the air pressure in the brake cylinder exceeds 2·0 kg./cm.² (28·2 lb./sq. in.). Mean retardation during electric braking is 0·8 metres (2·62 ft.) per sec. per sec.

The electric brake is very popular with the drivers because of its effectiveness, its automatic regulation, its great reliability and ease in handling. In addition, the consistent use of the electric brake entails two appreciable economic advantages: a saving in brake blocks, and a saving due to the regeneration of energy.

As already mentioned, the electric brake is used to decelerate the train from a mean speed of 33 m.p.h. to one of 12 m.p.h. By that time, the train has already lost 85 per cent of its kinetic energy. Correspondingly, the wear of brake blocks is reduced, under the influence of the electric brake, to about one-sixth, as is in fact borne out by the reduction in maintenance work and by comparison with trains not equipped with electric brake. Apart from the economic advantages brought about by the reduction in the numbers of brake blocks and working hours needed, it is also relevant to mention the corresponding reduction in brake dust at the stations which has a very favourable influence on the effectiveness of insulation on the line and on the vehicle.

But of even greater interest in this connection is the particular success of the regenerative brake. As already mentioned, this brake is designed to act during every braking operation down to a speed of 24 m.p.h., in accordance with the rating of the traction motors and exciter generators. Over the average stop-to-stop distance, the electric brake should normally begin to be applied when travelling at a speed of 33 m.p.h.

The diagram of a trial run which was admittedly carried out under special conditions is shown in Fig. 5. In order to obtain a maximum of regenerated energy, provision was made for the unimpeded return of the energy to the current rail system where it could be consumed at once. The values shown here relate to a motor coach, and not to a three-car unit. It will be seen that the returned energy measured at the current shoe amounts to 1·4 kWh.

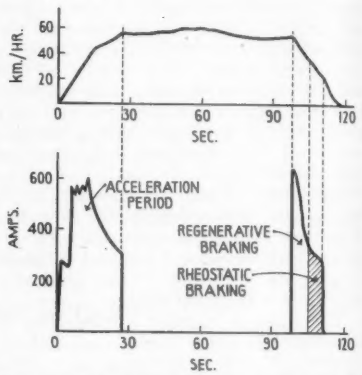


Fig. 5—Diagram of a regenerative braking operation

The energy consumed during acceleration was 4·6 kWh., but this amount is somewhat below normal as the section concerned has a down gradient. If the difference between the speed after acceleration and the speed at the beginning of electric braking is assumed to be that of the normal diagram, shown in Fig. 4, the energy consumed for acceleration would amount to 5·4 kWh. In that case, the regenerated energy would have amounted to 25 per cent, which is an appreciable percentage.

With this trial, the maximum brake power of one motor coach was 830 kW. when braked at a speed of 34 m.p.h. A normal S-Bahn train, consisting of two three-car units, i.e., four motor coaches and two trailers would, if electric braking sets in at a speed of 34 m.p.h. feed the current rail with a power of 3,320 kW., and with a correspondingly higher power at higher speeds. Even a half-length train consisting of one three-car unit would still have a brake power of 1,660 kW. at that speed. In keeping with the theoretical calculation, the trial run has clearly shown that, with service braking in urban railway operation, one

obtains a very high power (in kW.) of short duration together with a comparatively small quantity of energy (in kWh.) per braking operation.

It is this fact which is the source of all difficulties with such operation of regenerative braking. For, the brake energy must be consumed at the moment at which it is generated, and must therefore be transmitted along the line until one or more consumers are found. If the possibility of using inverters is discounted for the moment, the only consumers can be trains in motion. But the transmission of energy requires a voltage drop. The braking train must therefore brake at a higher voltage than the nominal voltage of the current rail, and the voltage difference must be the greater, the greater the brake energy and the distance over which it must be transmitted.

The most important prerequisite to regenerative braking is therefore to permit a considerable voltage rise at the braking trains. On the Hamburg S-Bahn, a voltage of 1,550 is therefore admitted. If the voltage of the braking train exceeds that value, because the consumer is too far away or because the brake energy is excessive, the rheostatic brake is automatically switched in. In that case, regenerative braking cannot be re-applied during the same braking operation.

In practice, it is found that regenerative braking of all the four motor coaches of a full-length train only occurs in particularly favourable circumstances. According to the distance and speed of adjacent trains, only three, two, or one of the motor coaches will apply regenerative braking whilst the remainder use the rheostatic brake. Conditions are the more favourable, the more trains there are on the line. On the Hamburg S-Bahn, the intervals between trains vary between 3 and 10 min. during the day, widening out to 20 min. at early and late hours.

Because of these difficulties (absence of a consumer of corresponding energy at the moment of braking), the practical regeneration results do not reach the level of 25 per cent attained during the trial run. To ascertain the quantity of regenerated energy, which can be regained in practice, an extensive survey has been carried out. First of all, the current consumption per 24 hr. of the entire electrified S-Bahn system was measured over a period of two weeks when the regenerative brakes of all motor coaches were cut out. The readings could be carried out very easily as the total feed of 25 kV. three-phase current to the substations can be measured at a single meter.

After these two weeks, the regenerative brake was gradually restored at the rate of 15 motor coaches per week, and the daily consumption of three-phase current was again read off until, after eight weeks, the regenerative brakes of all motor coaches were again in operation. The readings showed an almost constant reduction in three-phase current consumption during the whole of this period. At the end, the reduction amounted to almost exactly 10 per cent. (Fig. 6). It will be noted from the diagram that the amount of regained energy, here expressed as reduced current consumption, shows a very uniform increase, although one might have expected a gradual saturation.

It was, moreover, possible to record the total kW. power of the S-Bahn system at the 25-kV., three-phase feeder points by means of a totalising recorder, first at a time when all regenerative brakes were in action, and again when all of them were cut out (Fig. 7). A comparison of both curves shows

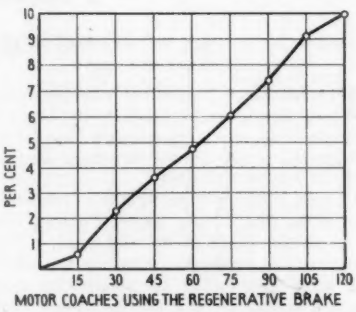


Fig. 6—Reduction in traction current consumption, measured at the three-phase feeder

clearly that the regenerative brake not only has the effect of reducing the consumption of electric energy but also that of reducing the power peaks in about the same proportion. Ultimately, both features are of equal importance as they tend to reduce the cost of three-phase current energy.

As the immediate use of regenerated energy is of such a decisive importance, it is an obvious idea to resort to inverters which would return the energy into the three-phase grid which is always ready to consume it. Before this idea can be realised, however, it is necessary to carry out a close examination not only of the technical possibilities but also of the economic conditions. As the possibilities of regaining electric energy during the service braking of frequently stopping trains represent a technically and economically worthwhile engineering proposition, preliminary work on the use of substation inverters for the improvement of the total energy saving was initiated some time ago.

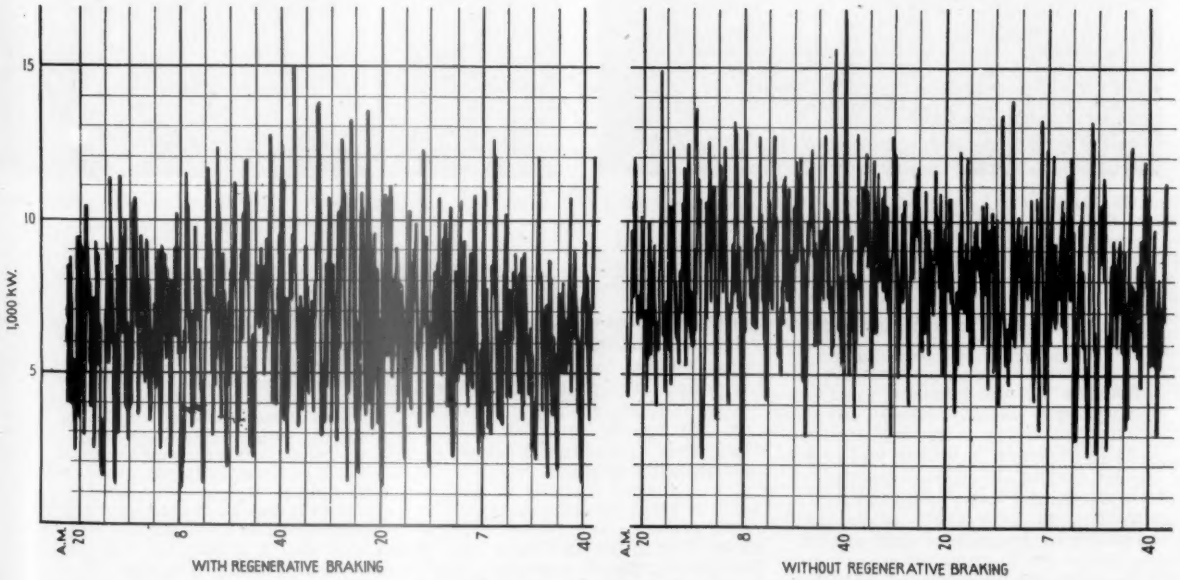


Fig. 7—Three-phase power absorbed at the feeder point, with and without regenerative braking

Tunnel Ventilation-Shaft Inspection

Hexagonal suspended cage and portable radio telephones

TO facilitate periodical examinations of tunnel vertical shafts by District Engineers, the equipment described below is in use on the Western Region of British Railways.

Light military-type trestling is erected on each side of the tower forming the top of the shaft to be inspected. This supports a cat-head spanning the shaft at such a level as to permit of easy egress on to the top of the tower from a cage suspended from the cat-head. On the ground beside this staging is a 3-ton hand winch equipped with a ½-in. dia. non-rotating steel rope with a 9·9-ton breaking load, which passes through a pulley suspended from the centre of the cat-head. A swivel hook at the end of this rope carries the inspection cage.

Hexagonal Cage

This cage is hexagonal in plan, measuring 5 ft. 2 in. across the corners, and has a steel frame, a 2-in.-thick timber floor, a roof, and a weight of 13 cwt. empty. It can accommodate three persons, but if walkie-talkie equipment is used it will carry only two in comfort. To the bottom of the cage a second rope is attached centrally, so that slight tension exerted upon it by a small winch in the tunnel steadies the cage and prevents excessive swaying.

To record the height of the cage at any time above the crown of the tunnel, a hemp rope marked off at 10-ft. intervals hangs down from one corner of the underside of the cage. Communication between the top of the shaft, the cage, and the tunnel is maintained by three portable radio telephones.

The illustrations show this equipment in use during the recent inspection of Caerphilly Tunnel, 1,933 yd. long, which has five 9-ft. dia. vertical aid shafts, measuring 142, 318, 362, 189, and 86 ft. from crown of tunnel to tops of towers.

We are indebted to Mr. M. G. R. Smith, Chief Civil Engineer, Western Region, for the above information.

Cage ascending; note steadying rope passing round anchor pulley from small winch

Underside of cage with central steadying rope and corner measuring line

Scottish Region Track Maintenance

(*Concluded from page* 304)

Because of its front-end working facility, the ballast cleaner can be worked on single track and can be usefully employed in tunnels and under bridges, and so on. Ballast removal up to a depth of 18 in. below sleepers is possible, and both depth of cut and crossfall may be adjusted during working.

Apart from its normal work of ballast cleaning, the 3B5 machine has carried out the track lowering work at Drumry Bridge in connection with the electrification scheme for the Airdrie-Helensburgh line. Besides the ballast cleaner, Matisa tamping machines are used for consolidating the screened ballast; all districts in the Scottish Region are supplied with tamping units.

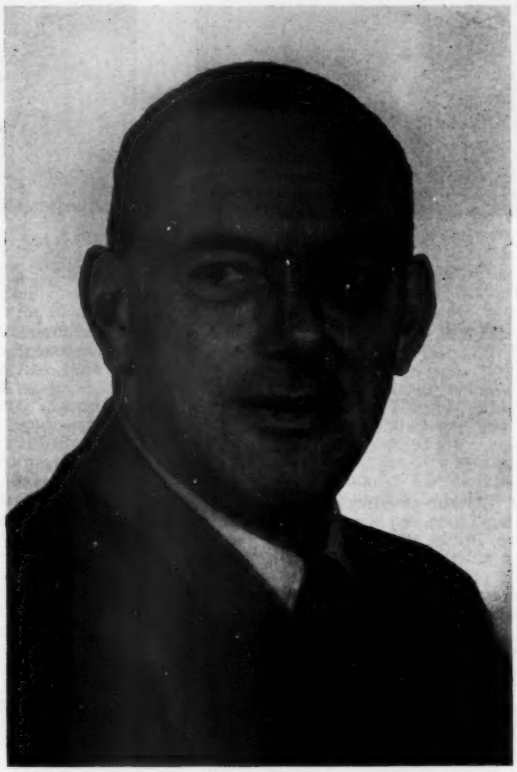
MORE CAR PARKING SPACE AT TUBE STATIONS.—London Transport has announced that car parking space for another 285 cars is to be provided at Underground stations in the suburbs. A new car park for 43 cars is to be built at East Finchley station on the Northern Line, and existing car parks at five other tube stations are to be enlarged. When the work is completed by the summer there will be car parks holding nearly 2,400 cars at 42 Underground stations. London Transport policy is to provide open car parks wherever possible at stations in the suburbs, so that motorists can leave their cars and do the rest of the journey to the centre of London by train. It hoped that news that space is to be made for another 285 cars will help motorists during the present petrol rationing.

RAILWAY NEWS SECTION

PERSONAL

Mr. J. R. Farquharson, General Manager of Sudan Railways, has been appointed to succeed Sir Arthur Kirby as General Manager of East African Railways & Harbours. It is not expected that Mr. Farquharson will take up his new duties until early October this year, though he intends to visit East Africa in May on his way to the United Kingdom from the Sudan on leave. Sir Arthur Kirby will remain as General Manager until the end of June.

Mr. F. J. McIntosh
Chief Engineer, Rhodesia Railways, 1953-57



Mr. A. M. Hawkins
Appointed Chief Engineer, Rhodesia Railways

Mr. F. J. McIntosh, O.B.E., B.Sc.Eng., M.I.C.E., Chief Engineer, Rhodesia Railways, who, as recorded in our February 22 issue, has retired from that position, was born in South Africa and educated in Pretoria and University College, Johannesburg (now Witwatersrand University), where he obtained a B.Sc. degree in engineering in 1922. Before joining Rhodesia Railways in September, 1924, as a Junior Assistant Engineer, Mr. McIntosh worked for two years on the Railway Location Survey in the Union of South Africa. He served as Assistant Engineer in Southern and Northern Rhodesia and Portuguese East Africa, including a period of one year as Resident Engineer on the construction of the Copperbelt Branches in 1928 and two years as Assistant Engineer in charge at Beira from October, 1929, to November, 1931. Following periods as Assistant Engineer at Broken Hill and Salisbury, Mr. McIntosh was appointed Acting District Engineer, Broken Hill, in September, 1944. He was confirmed in this appointment in October, 1945, and transferred to Salisbury as District Engineer in October, 1946. After periods of acting as Deputy Chief Engineer in 1949, Mr. McIntosh was appointed Deputy Chief Engineer, Administration, in January, 1950, and Deputy Chief Engineer in September, 1950. He officiated as Chief Engineer for two months in 1951, and from May to November in 1952. Mr. McIntosh was appointed Chief Engineer on January 9, 1953.

Mr. P. C. Mukerjee has been appointed Chairman of the Indian Railway Board, succeeding Mr. G. Pande, who has retired.

Mr. M. Khalid has been appointed Controller of Stores, North Eastern Railway, India.

We regret to record the death, on February 27, of the Hon. Hugh Terence de Burgh Bingham, A.M.I.C.E., son of the 5th Baron Clanmorris, at the age of 71. Mr. Bingham joined the Indian State Railways as an Assistant Engineer in October, 1909, and was promoted Executive Engineer in 1917. Among other appointments held by him were those of Deputy Director of Projects, Railway Board; Superintendent of Works, and Deputy Chief Engineer, latterly on the N.W.R. He was appointed Senior Government Inspector of Railways in 1934, and was promoted to be Chief Engineer (Provisional) in August, 1937.

Mr. A. M. Hawkins, B.Sc.Eng.(London), Assistant Chief Engineer, Rhodesia Railways, who, as recorded in our March 8 issue, has been appointed Chief Engineer, Rhodesia Railways, effective from January 9, joined that system as a Junior Assistant Engineer at the end of 1926, after taking his degree in civil and mechanical engineering at London University and obtaining practical experience in various departments of the former North Eastern and Great Western Railways. His first eight years in Rhodesia were served in Northern Rhodesia at Livingstone and Broken Hill where he was engaged on the development of stone quarries for the initial stone ballasting of the line, re-laying, and developing of Ndola and the Copperbelt area generally. Mr. Hawkins then spent two years in charge of the Vila Machado-Umtali section where he supervised the construction of numerous deviations and a heavy programme of culvert replacement. In mid-1936 he was placed in charge of various sections of 80-lb. re-laying between Salisbury and Choma. In 1939 he was transferred to Umtali and was in charge of the Umtali-Salisbury section until 1942 when he was seconded to the South African Railways to take charge of the re-laying and stone ballasting of the system's lines between Bulawayo and Mafeking. In 1948 Mr. Hawkins was appointed Maintenance

Mr. A. F. Moss

Assistant Operating Superintendent, Scottish Region, 1954-57

Mr. P. J. Fisher

Appointed Divisional Operating Superintendent, London Midland Region

Mr. H. S. Tanner

Appointed Stationmaster, Brighton, Southern Region

Engineer, and, early in 1953, became Deputy Chief Engineer (Construction), in which capacity supervised construction of the Dett-Wankie deviations, the building of Mpopoma Yard and Bulawayo Avoiding Line and the building of the South East Railway. He became Assistant Chief Engineer in 1955.

Mr. Arthur Frederick Moss, M.B.E., Assistant Operating Superintendent, Scottish Region, British Railways, who, as recorded in our March 8 issue, retired from railway service on February 28, began his railway career in the Advertising Department of the former North Eastern Railway, York, in July, 1907. He later served in the District Superintendent's Office, Leeds, before joining H.M. Forces in December, 1914. From 1914 to 1919 he was on active service with the Yorkshire Hussars and the Machine Gun Corps. On demobilisation Mr. Moss was appointed Relief Stationmaster at Newcastle and subsequently occupied positions at York, Hull, and Newcastle, later becoming District Goods & Passenger Manager at Peterborough, District Superintendent at Manchester, and District Superintendent at Nottingham. He was appointed District Superintendent, L.N.E.R., Glasgow, on January 1, 1946, and, on nationalisation in 1948, became District Operating Superintendent of the enlarged Glasgow District which embraced the former L.N.E. and L.M.S. districts. He remained in that position until February 1, 1954, when he became Acting Assistant Operating Superintendent, Scottish Region, and was confirmed in that appointment on April 1, 1955. He was made an M.B.E. in 1951.

Mr. P. J. Fisher, Modernisation Assistant to the Chief Operating Superintendent & Chief Commercial Manager, London Midland Region, who, as recorded in our February 15 issue, has been appointed Divisional Operating Superintendent, Crewe, began his railway career on the former L.M.S. in 1928. After gaining experience at various stations and in the staff office at Derby he served on a shunting analysis committee for the Western Division, later becoming Assistant Signalmen's Inspector at Bangor. Appointment to a similar position at Willesden followed, after which Mr. Fisher became a Runner at Euston. He became Assistant District Controller, Peterborough, in 1936 and, two years later, moved to a similar position at Rugby. During the 1939-45 war he joined H.M. Forces in the Royal Engineers and served in railway operating units in France in 1940, later attaining the rank of Lt.-Colonel and serving in West Africa, Italy, and South East Asia. On his return to railway service in 1945 Mr. Fisher was appointed Assistant

Mr. C. W. Edwards

Appointed British Railways General Agent for Belgium & Luxembourg

Mr. A. E. Grimsdale

Appointed Manager, Home Sales, of the Metropolitan-Vickers Electrical Co. Ltd.

The late Mr. R. H. Whitelegg

Partner, Messrs. Whitelegg & Rogers, 1930—41

District Operating Manager, Liverpool, and, a year later, District Operating Manager, Rugby. In 1947 he became District Operating Manager, Liverpool (Lime Street). This position, was redesignated District Operating Superintendent, Liverpool (Lime Street) the following year. In 1954 he became Assistant (Freight) Services, Euston, and, in 1955, Modernisation Assistant, the position he now leaves.

Mr. H. S. Tanner, who, as recorded in our February 22 issue, has been appointed Stationmaster at Brighton, Southern Region, British Railways, entered the service of the London & South Western Railway at Guildford in October, 1913, as a Signal Box lad. After serving in various capacities at Guildford until 1920 Mr. Tanner was appointed to the London West Relief Staff, in which he served until 1940. From 1940 to 1943 he was engaged in Freight Control duties at Eastleigh, and, after one year as Assistant Stationmaster at Guildford, he returned to Eastleigh as Yardmaster, dealing there with the vital " D " Day traffic. Then followed five years as Area Inspector until 1950 when he became Assistant Stationmaster at Waterloo. He was appointed Senior Assistant Stationmaster at Waterloo in 1951, Stationmaster, Tonbridge, in 1953 and Stationmaster, Eastleigh, in 1954.

Mr. C. W. Edwards, who, as recorded in our February 22 issue, has been appointed British Railways General Agent for Belgium & Luxembourg, at Brussels, began his railway career as a clerk on the former Great Western Railway at Penzance in 1934. After gaining experience at various stations in the Plymouth Division he joined H.M. Forces in the Royal Engineers in November, 1939, serving in France, Belgium, and Germany. Following demobilisation in 1946 Mr. Edwards rejoined the G.W.R. and, in July of the same year, transferred to British Railways Office in Paris. Two years later he became British Railways' Liaison Officer at the Headquarters of the International Union of Railway (U.I.C.) in Paris, the position he held until his appointment as General Agent, Brussels, on November 1, 1956.

Mr. A. E. Grimsdale, B.Sc. (Eng.), Special Assistant, Sales Management, Metropolitan-Vickers Electrical Co. Ltd., who,as recorded in our February 15 issue, has been appointed Manager, Home Sales, with special responsibility for home district offices, took his degree from Brighton Technical College and joined M-V as a college apprentice in 1922. After spending three years as traction engineer in the company's Sydney (Australia) office, and a further two years in the Traction Control Department at Trafford Park, he transferred to the Traction Sales Department in 1932. From 1941 to 1945 he was Assistant to the Works Manager at the company's Sheffield Works, being concerned with the war-time production of rotating electrical machines for service contracts. At the end of the war he became Deputy Sales Manager, Traction Department, and, in 1946, was appointed Manager, Traction Sales Department. His appointment as Special Assistant, Sales Management, was in January, 1953, and since June, 1954, he has been a Director of Metropolitan-Vickers Electrical Export Co. Ltd.

We regret to record the death on March 9 of Mr. Robert H. Whitelegg, a partner in the firm of Whitelegg & Rogers. Mr. Whitelegg, who was born in October, 1872, received his early training on the London, Tilbury & Southend Railway, and afterwards had varied experience at the works of the Metropolitan Railway Carriage & Wagon Co. Ltd. and Nasmyth Wilson & Co. Ltd. In 1900 he became Assistant Locomotive Superintendent of the London, Tilbury & Southend Railway, and, in 1910, succeeded his father, the late Thomas Whitelegg, as Chief of the department. Soon afterwards he introduced a number of 4-4-2 tank locomotives which became the best-known group on the line. They were fitted with an ingenious variable blast-pipe which was coupled to the reversing shaft so as to produce the optimum blast for any given cut-off. One of these locomotives, " Thundersley " (No. 80), was exhibited in its original colours at Southend last year during the centenary celebrations of the line. In 1913, on amalgamation of the London, Tilbury & Southend Railway with the Midland Railway, Mr. Whitelegg resigned and, the following year, joined a firm of agricultural engineers in Northampton as Managing Director. In 1915 he became Consulting Engineer in London for the Canadian Locomotive Company which at that time was supplying locomotives to the Overseas Forces in France. In 1917, at the invitation of the Deputy Controller of Merchant Shipbuilding, he joined the Admiralty, where he was chiefly engaged in the standardisation of shipyard machinery and inspection of shipbuilding material in connection with the construction of standard ships; in 1918 he was appointed Chief Mechanical Engineer of the Glasgow & South Western Railway. During his term of office he was responsible for many improvements in the locomotives and rolling-stock of that railway. He took an active part in the formation of the Scottish Centre of the Institution of Locomotive Engineers and was its first Chairman, and, for the session 1922-23, was President of the main body in London. In 1923 Mr. Whitelegg was appointed Mechanical Engineer, Kilmarnock, London, Midland & Scottish Railway, but, on re-grouping in that year, joined Beyer, Peacock & Co. Ltd. as that company's General Manager & Engineer-in-Chief. Seven years later he resigned this position to undertake a comprehensive tour of railways and engineering works in the U.S.A. and Canada. After completion of the tour in 1930 he entered into partnership as a locomotive engineer with Mr. J. D. Rogers, formerly Assistant Superintendent of Motive Power, Virginian Railway. Mr. Whitelegg retired from the firm of Whitelegg & Rogers in 1941.

Mr. H. Maxwell Rostron, M.I.E.E., is relinquishing his appointment as Engineer & General Manager to the Liverpool Overhead Railway Company on March 31, and is going into practice as a Consulting Engineer & Transport Adviser at No. 13, Rumford Street, Liverpool, 2. Mr. Maxwell Rostron, who was educated at the Merchant Taylors' School, Crosby, and the Bootle and Liverpool Technical Colleges, is a chartered engineer. He served an articled apprenticeship as Mechanical & Electrical Engineer with the Bootle firm of James Scott Limited, and before joining the Liverpool Overhead Railway in May, 1943, was with Pirelli General Cable Works Limited and the English Electric Co. Ltd. An active member of the Home Guard in Southampton, on moving to Liverpool, he obtained a transfer of duties and was appointed a Company Training Officer in the 88th County of Lancaster Battalion. He is a former member of the Council of the Liverpool Engineering Society, a Fellow of the Permanent Way Institution, a member and former President of the Liverpool Amateur Photographic Society, and, until last year, a member of the Rotary Club of Liverpool and the Liverpool Skal Club. He is the eldest son of the late Sir Arthur Rostron, a former Commodore of the Cunard Line, and well known as Captain of the *Carpathia*, which took a leading part in the rescue of the *Titanic* survivors in 1912, and for his command for eleven years of the first *Mauretania*.

Mr. Angus Murray has been appointed Managing Director of the Expert Tool Group of Companies.

Lord Ridley has been appointed a member of the Advisory Council of the Export Credits Guarantee Department following the resignation of Lord Mills on becoming Minister of Power.

Mr. G. R. H. Nugent, J.P., M.P., Joint Parliamentary Secretary to the Ministry of Transport & Civil Aviation, has appointed Miss K. S. Dee to be his Private Secretary, with effect from March 1, 1957, in succession to Mr. J. R. Steele, who has been promoted.

We regret to record the death on February 25, at the age of 79, of Mr. F. H. Clough, C.B.E., M.I.C.E., M.I.E.E., who, until his retirement in 1947, was for many years Assistant Chief Engineer of the British Thomson-Houston Co. Ltd. at Rugby. Mr. Clough, who was born at Melbourne, Australia, had served with Siemens Brothers of Woolwich and Siemens & Halske, Germany. During the 1914-18 war he was Technical Adviser to the Director of Torpedo & Mining at the Admiralty, and for his services was warded the C.B.E. He was a former Chairman of the Midland Centre of the Institution of Electrical Engineers and had served on the Council of that body in London.

Brussels World Exhibition, 1958

Membership of the Organising Committee of the British Electrical & Allied Section of the Universal & International Exhibition, Brussels, 1958, to which editorial reference is made elsewhere in this issue, is as follows:—

Chairman:

Mr. D. Maxwell Buist, British Electrical & Allied Manufacturers' Association.

Members:

Mr. A. H. Carmichael, Cable Makers' Association.

Mr. J. H. Campion, Electric Light Fittings Association.

Mr. J. Read, Radio Communication & Electronic Engineering Association.

Mr. H. Faulkner, Telecommunication Engineering & Manufacturing Association.

Mr. K. J. McKillop, Mr. G. M. C. Peacock, and Mr. L. G. A. Whyte, Water-Tube Boilermakers' Association.

Mr. J. O. Knowles, British Electrical & Allied Manufacturers' Association.

Mr. C. H. Chaplain, British Thomson-Houston Co. Ltd.

Mr. G. Henderson, Bruce Peebles & Co. Ltd.

Mr. D. Graham, Crompton Parkinson Limited.

Mr. C. T. M. Bagnall, English Electric Co., Ltd.

Mr. J. M. Hallett, Ferranti Limited.

Mr. D. G. W. Acworth, General Electric Co. Ltd.

Mr. J. F. Perry, Metropolitan-Vickers Electrical Co. Ltd.

Organising Secretary:

Mr. S. Black, British Electrical & Allied Manufacturers' Association.

NEW EQUIPMENT AND PROCESSES

Remote Reading Gauge for Inflammable Liquids

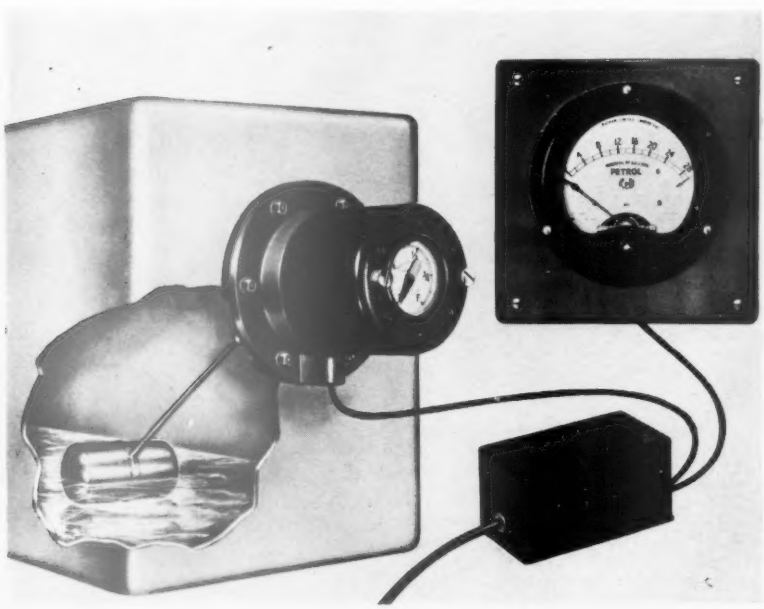
THE R. & G. B/IS Gauge is designed to indicate liquid levels in tanks which contain liquids likely to form explosive fumes. This version has Ministry approval and complies with B.S. 1259: 1945. Suitable for application to storage tanks containing petrol, for road motor and motive power depots and rail tank wagons, the gauge operates on an intrinsically safe electrical circuit. The gauge consists of three separate units: the tank unit, power unit and the receiver. Only the power unit must be kept out of the danger area of fumes.

The tank unit utilises the R. & G. magnetic drive through the solid body of the unit, which overcomes any possibility of leakage and ensures complete seal-off of the tank under pressure and vacuum conditions. The float arm which is pivoted to the back of the unit, imparts a rotary movement to the magnetic coupling, which in turn operates the electrical transmitting mechanism. This is hermetically sealed to prevent danger from condensation. A local dial fitted to the tank unit can be incorporated if required, and as this is driven magnetically, it is not affected by supply failure.

Special types of tank units are also available to suit high and low temperature application, interface operation, and test pressures up to 560 p.s.i.g., and the materials of the tank unit can be varied to suit corrosive and contaminated liquids.

The power unit, which is enclosed in a metal case, converts single phase a.c. mains supply into low voltage d.c. and incorporates an adjustable resistance so that line losses may be compensated. The power unit can also incorporate automatic voltage stabilisation, in cases where voltage is subject to large fluctuations. The receiver is a standard electrical moving coil instrument of the panel mounting type and is available in a range of sizes and patterns. The dial is calibrated in accordance with the customer's requirements and to suit individual tanks. A special feature is an off-scale indication in the event of supply failure.

Delivery of the B/IS unit is approximately eight weeks. The price will be quoted on receipt of details of the proposed application, by the manufacturer, Bayham Limited, 12 Lower Grosvenor Place, S.W.1.

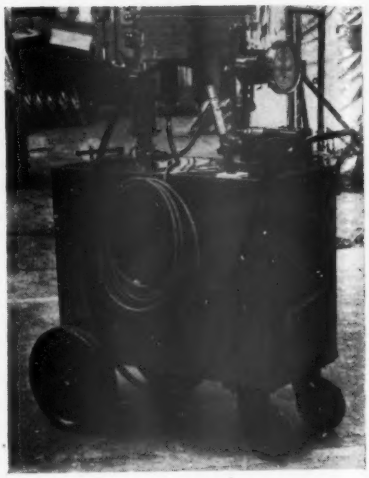


Mobile Oil Dispenser

THE Type 703 ES Dispenser has been designed to meet the requirements of British Railways for a unit with which to top-up the engines of diesel railcars. Two units have been ordered by the Eastern and North Eastern Regions.

An advantage of the machine is that it can be used in sheds with or without compressed air points, oil being dispensed from the 50-gal. capacity tank either by means of an air operated pump at 80 p.s.i. or by a hand-operated submerged valve type pump. A change-over cock permits the selection of the service required. A totalisator with a 7-in. dial enables an easy check to be made on oil delivery.

The unit, of fabricated steel construction, runs on two 16 in. dia. pneumatic wheels and two 8 in. dia. rubber castors. It is supplied complete with 15 ft. of oil delivery hose terminating in a quick-action bib cock which can be holstered when not in use, thereby allowing any surplus to return to the tank; 20 ft. of air hose is also supplied with the Wakefield air operated pump. Leading particulars of the unit are: height 4 ft. 6 in., length 3 ft. 9 in., width 2 ft. 3 in., weight 252 lb.



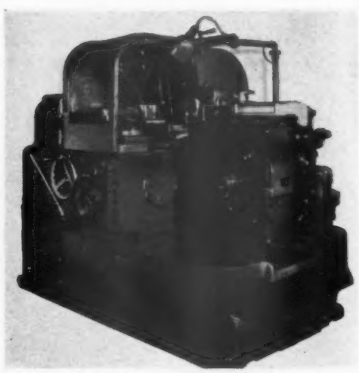
The price of the Type 703 ES is £168 15s. and delivery is six weeks. The manufacturer is C. C. Wakefield & Co. Ltd. and it is marketed in the U.K. by Wakefield-Dick Industrial Oils Limited, 67 Grosvenor Street, London, W.1.

Automatic Turret Lathe

THE Swiss-built Tarex automatic lathe makes use of standard cams and it is possible to process small or medium batch quantities as well as larger numbers. It appears suitable for repetitive operations for brake equipment components and so on.

An interesting feature of the lathe is that it is fitted with a universal spindle, the changeover from bar to chuck work taking less than one hour. The lathe has four slides, two of which have compound movements and, by the use of an in-built accelerator, the same turret cam can be used for components varying in size and shape. Either a six- or eight-position turret can be fitted and, as the machine can be equipped with an accurate spindle positioning device, multi-drilling and multi-tapping of unsymmetrical components can be included in the automatic cycle.

As well as the normal collet work and



chucking system, that is mechanical, hydraulic and pneumatic, two special chucks are available. The first is a hollow chuck by the use of which black bars and similar items varying in diameter by 0·02 in. can be fed through the spindle. The second is an indexing chuck.

An efficient thread chasing attachment is available as well as such refinements as hydraulic copying, side drilling or milling, automatic/infinitely-variable spindle speed selections, automatic loading and unloading arrangements.

The fastest cycle of production time is 28 sec., the slowest, 800 sec. The standard change gears supplied enable up to 67 cycle periods to be chosen. The camshaft speed can be repeatedly increased during any cycle by the automatic acceleration mechanism. The accelerated speed is 40 sec. for one complete camshaft revolution.

The machine is powered by a 12 h.p. three-phase main motor fitted with a star delta starter. The lathe can be supplied to suit 50 or 60 cycle operation with normal voltages as standard. The motor is protected by thermic and magnetic overload devices and is fitted with push button control. The coolant pump motor, protected thermically, is rated at 1 h.p. The machine is built in five sizes up to a maximum bar capacity of 3½ in. and a maximum chuck capacity of 7 in. dia.

Price and delivery details can be obtained on application to the distributor in the U.K., Tarex (England) Limited, 22, Buckingham Gate, London, S.W.1.

Conventional Drive Dumper

THE Mark III Dumper has been built with engine and gearbox in line, whereas previous types of the range have had belt drive. Of use for construction site work, earthwork, ballast and concrete conveyance, and so on, the Mark III is fitted with open-centre, deep-tread, track-grip tyres. The heavy duty constant mesh type gearbox gives three forward speeds, 4, 8, and 15 m.p.h. and one reverse 4 m.p.h.

Power is supplied by a 2-cyl. 12-h.p. Petter diesel engine. It is fitted with a meehanite flywheel, extra deep sump and special fuel pumps.

The skip is of all-welded steel construction and is angled outwards at all points so that sticky loads such as wet earth or clay can be easily cleared and do not wedge; it is tipped by means of hand lever and resets automatically when empty. Struck capacity is 1 cu. yd. and the water capacity of 16 cu. ft. will take full batch from a 21/14 or two 10/7 concrete mixers without spillage. Lip height is only 3 ft. 4½ in.

The main frame is of robust construction. Both axles are designed for dumper use. The hypoid-type driving axle being of a "three-quarter floating" type is protected from most of the load; the steering axle is centrally pivoted to give a "float" on either wheel of 1 ft. Steering is light and simplified by angled kingpins which make it self-aligning. A well-sprung seat with high back reduces fatigue, all controls are within easy reach and the driver has unobscured vision.

Overall dimensions are: length 9 ft. 10½ in., height 5 ft. 4 in., and width 5 ft. 10 in., and the wheelbase is 5 ft. 6 in. Weight is 21 cwt.

The price of the Mark III Dumper is £595 and delivery can be made from stock.

The manufacturer is Bates Bros. (S.M.W.) Ltd., Baguley, Wythenshawe, Manchester 23.

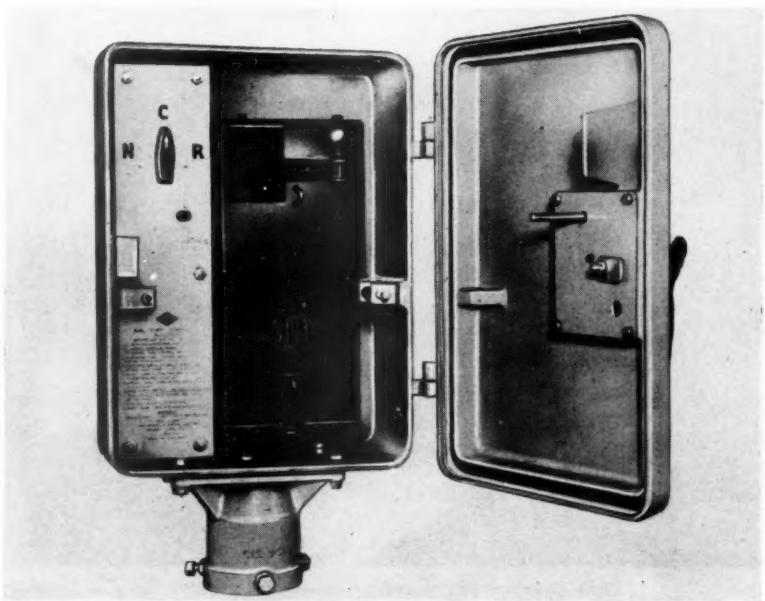
C.T.C. Dual-Operation Point Controller

WHERE points are remotely-controlled by C.T.C. or a similar system, provision must also be made for local operation. The Type HL dual point controller illustrated below is designed to enable points to be operated locally by power, or by hand in an emergency.

Opening the case by a special key gives access to a three-position rotary switch for local power operation and also to a crank handle which can be removed if it is necessary to work the points by hand. When the rotary switch is operated the handle is left in position, and the points are thrown by moving the rotary switch to "N" or "R" as required, after which it must be restored to the central position (for remote control) before the door can be reclosed. The crank handle is removed by first turning it to the left, which makes the necessary changes in the circuit controller contacts. Again, a cam prevents the door from being closed until the handle has been replaced and moved to its right-hand position. The key is also retained in the lock until the door has been closed and relocked.

With C.T.C. installations a train crew can be given a key in a sealed pouch, which must be surrendered on leaving C.T.C. territory. Production of the pouch shows whether the key has been used, while the key itself could not have been retrieved from the controller unless all controls had been correctly replaced to normal.

The Type HL dual point controller is manufactured by the Siemens & General Electric Railway Signal Co. Ltd., East Lane, Wembley, Middlesex.



Addition to Range of Ruston & Hornsby Diesel Locomotives

44-ton shunter has a number of special features

The diesel-mechanical locomotive built by Ruston & Hornsby Limited, which was demonstrated for the first time last week at the Central Electricity Authority Drakelow Power Station, Burton-on-Trent, is the first of a new range to meet the demand for a medium shunting unit to replace steam locomotives with 16-in. and 18-in. cylinders. The diesel locomotive incorporating the Paxman vee-type 8RPHL engine, arranged for electric starting, which develops 333 b.h.p. at 1,250 r.p.m., is designated type LWS.

The first of these locomotives was delivered to Drakelow Power Station 15 months ago. It was decided that no demonstration would be held until the machine had completed a substantial number of hours and its performance thus judged in the light of operational experience.

Trials of the LWS were carried out on British Railways track. It was subsequently delivered by being driven direct from Lincoln to Drakelow via Derby and Nottingham.

Drakelow "A" Power Station opened in October, 1955, and is planned to produce 720,000 kW. The "B" station is now in the course of construction on an adjacent site. The total length of sidings at Drakelow "A" Station is 7·6 miles included in which are full wagon sidings with a capacity of 5,000 tons. Handling is at the rate of forty 12-ton wagons per hour and coal storage capacity is 56,000 tons. At this time of year the "A" Station uses some 18,000 tons of coal each week.

Shunting Duties

Two LWS locomotives are now at work at Drakelow, a second unit having been delivered a few weeks ago. A third machine will be delivered later.

This first unit, which has now completed over 2,600 hours service and covered over 7,700 miles, has been used daily up to 12 hours per day in forming mixed coal trains which are shunted into one of four tipplers. The trucks, after tipping, are shunted in trains of up to 45 wagons to the empty sidings and sorted to form departure trains for the various collieries. The gross tonnage handled per day is approximately 2,600 tons. The average number of wagons being handled is 175.

Acceptance trials included hauling trains of 856 tons in first and second gear against gradients of 1 in 216 and 1 in 247. The load in third gear at 8 m.p.h. on this gradient was 503 tons and 252 tons was handled at 14·5 m.p.h.

Design Features

Special measures have been taken in the jackshaft design and gearbox location to avoid subjecting the gearbox casing to the normal driving loads. The final drive shaft is a sleeve and the jackshaft is carried on bearing housings mounted on the frame side-plates which take the loads; the drive is transmitted by splines from the sleeve to the jackshaft. An interesting feature is that the jackshaft can be withdrawn sideways if it is required to remove the gearbox, although it is possible to drop the jackshaft in the normal way.

The axleboxes used are of the cast-steel single-flange type and split thrust collars are fixed to the axle between the boxes to take the side thrust, contrary to the previous practice of taking the thrust on the wheel. The faces are lined with renewable anti-friction material which can be renewed without jacking up the locomotive. The new arrangement is stated to avoid the abrasive action of wet grit which may drain down on the wheel bosses when the locomotive is standing for any length of time.

Another feature of the axle assembly is that the bronze step is designed with bore and outside concentric. This has been done so that new steps can be fitted by jacking the engine weight clear of the axle concerned, removing the axle box keep, and knocking the step around the axle, a new step being inserted in the same manner.

If it should be necessary to remove the axle box, the complete assembly may be slid inwards by jacking the weight of the unit and removing the split collar. Both operations can therefore be accomplished without lifting the locomotive from its wheels.

The connecting rods are profile burnt from plate and fitted with cast steel bosses at their ends, the rods being pivoted around the crankpins, to allow for vertical movement. The whole of the running gear is mechanically lubricated from a Wakefield lubricator.

Gearbox

In the constant mesh type four-speed gearbox, each speed train is brought in by a patent oil-operated cone clutch, the gears being splined to the spinner of the clutch and otherwise free to rotate on the shaft. Reversing is obtained by means of bevels and dogs and this is facilitated by a disconnecting clutch of a similar type. Special gear ratios which are below standard are incorporated in the locomotives being supplied to this power station. The non-standard speeds and haulage capacities are as follow:—

Gear	Speed, m.p.h.	Tractive effort, lb.
1	2·5	24,200
2	4·5	20,800
3	8	11,700
4	14·5	6,400

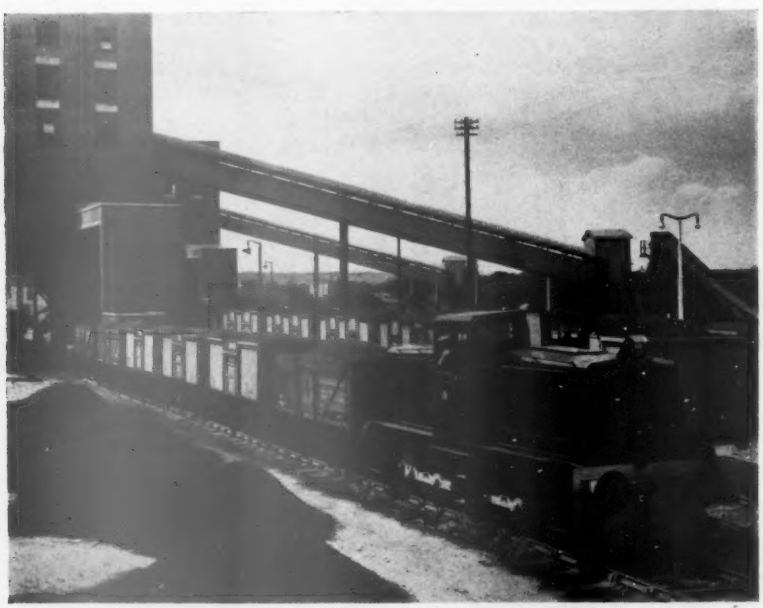
Haulage capacity and speeds with standard gear ratios are as follow:—

Gear	Speed, m.p.h.	Tractive effort, lb.
1	2·7	24,640
2	4·96	18,900
3	9·5	9,900
4	18·5	5,060

The totally enclosed cab is centrally disposed, driver's controls for gear change, air brake, sanding and engine speed control being duplicated on either side.

Separate control panels covering engine and gearbox temperatures and pressures are fitted. Braking requirements are provided by Westinghouse straight air type equipment.

The standard design of the L.W.S. locomotive can be supplied to suit gauges between metre and 5 ft. 6 in.



L.W.S. locomotive shunting wagons onto tippler

Eastern Region Modernisation Progress

Civil engineering work in preparation for the Eastern Region electrification of the Colchester-Clacton-Walton lines is making good progress. The electrification is due for completion next year and is to be carried out on the new high-voltage a.c. system for the immediate purpose of testing new multiple-unit electric trains in the local services and of trying out certain new techniques. At a later stage there will be a link-up with the extension of electrification from Chelmsford to Ipswich.

The engineering work involves alterations to 21 bridges, cutting-back of station awn-

ings, alterations to the track layout at seven stations, provision of load gauges and notices at level crossings, lengthening sidings at Colchester and Walton-on-the-Naze, and provision of an additional siding at Clacton. The steam locomotive shed at Clacton is to be adapted as a temporary inspection and maintenance depot for electric rolling stock. Alternative accommodation for steam locomotives and staff will be provided.

Bridge Clearances

Of the 21 bridges to be altered, 16 have to be raised to provide the necessary clearance for the overhead electric wiring and pick-up apparatus on the trains. The parapets of all 21 bridges are to be raised to conform with statutory regulations.

A long steel footbridge over the main line and sidings at St. Botolphs already has been raised and new parapets have been erected. Other bridges completed are Moler's bridge between Hythe and Wivenhoe and a footbridge at the latter station; Barker's bridge between Thorington and Great Bentley has also been raised, as has Thorpe Park Farm bridge between Thorpe-le-Soken and Kirby Cross.

The parapets of the Alresford Road bridge between Wivenhoe and Alresford stations and the Frinton Park Estate bridge at Walton station have been built up and similar work will commence shortly on the Weeley by-pass and Alresford by-pass bridges. A fifth bridge, at Colchester, has to be altered in the same way.

Larger works involving the reconstruction of bridges are either in progress or to be carried out at Cooks Green, Ipswich Road (Colchester), Bentley Tye, Brook Street (near St. Botolphs), and Anglesea Road and High Street at Wivenhoe.

The station awnings at Wivenhoe, Arlesford, Great Bentley, Kirby Cross, and Frinton have been cut back to provide the clearance for overhead electrification and similar work at Colchester is more than half completed.

Track slewing and re-positioning of points to make room for the erection of the overhead line equipment is yet to be carried out at Colchester, Hythe Junction, Wivenhoe, Great Bentley, Thorpe-le-Soken, Clacton, and Walton. At Thorpe-le-Soken station the centre track is to be converted for two-way working to allow trains stopped at the station for division of the Clacton and Walton portions, or for other purposes, to be by-passed by non-stop services.

Extensive drainage work has been completed at Thorpe-le-Soken where the Holland Brook has been diverted to a new course so that the track embankments could be strengthened.

The civil engineering work is being carried out under the general direction of Mr. A. K. Terris, Chief Civil Engineer, Eastern Region.

British Railways 1957 Locomotive Building Programme

The British Transport Commission has announced the following programme of 417 locomotives to be constructed in 1957 for British Railways.

BRITISH RAILWAYS WORKSHOPS

Quantity	Type	Works
Diesel		
10	B.R. standard 0-6-0 350-h.p. diesel-electric shunter	Crewe
76	" "	Derby
54	" "	Darlington
30	0-6-0 200-h.p. diesel mechanical shunter	Swindon
3	2,000-h.p. main-line diesel-hydraulic type "C"	Swindon
173		

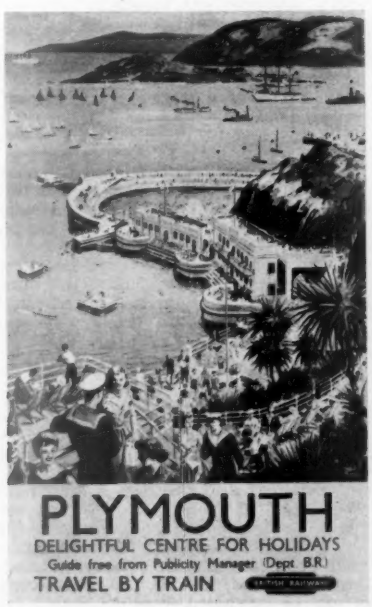
—	Class	B.R. Standard Type	Works
Steam			
47	9	2-10-0	Crewe
19	9	"	Swindon
10*	5	4-6-0	Derby
13	5	"	Doncaster
12	4	"	Swindon
21	4	2-6-0	Horwich
15	4	"	Doncaster
4	4	2-6-4T	Brighton
10	2	2-6-2T	Darlington
151			

* Fitted with British Caprotti valve gear

CONTRACTORS

Quantity	Type	Wheel arrangement	Builders
Diesel			
15	Main-line diesel-electric type "A"	BB	English Electric
7	" " "	BB	B.T.H.
1	" " "	BB	North British
2	Main-line diesel-electric type "B"	CC	Brush
6	Main-line diesel-hydraulic type "B"	BB	North British
10	Main-line diesel-electric type "C"	1CC1	English Electric
5	Main-line diesel-hydraulic type "C"	A1A-A1A	North British
6	300-h.p. diesel-hydraulic shunter	0-4-0	North British
12	200-h.p. diesel-mechanical shunter	0-6-0	Drewry Car
14	" " "	"	Hunslet
3	" " "	"	Andrew Barclay
12	200-h.p. diesel-hydraulic shunter	0-4-0	North British
93			

Western Region Publicity



THE
ISLES OF SCILLY
FOR SUNSHINE AND NATURAL BEAUTY
TRAVEL BY RAIL TO PENZANCE, THENCE
BY BOAT, R.M.V. "SCILLONIAN", TO ST. MARY'S
ACCOMMODATION ENQUIRIES
TO THE CLERK OF THE COUNCIL
BRITISH RAILWAYS

Three new posters produced by the department of the Public Relations & Publicity Officer, Western Region

Contracts and Tenders

The British Transport Commission has placed an order with the Gloucester Carriage & Wagon Co. Ltd. for 20 multiple-unit diesel two-car trains required in connection with the modernisation plan. These trains, which are for use in the Edinburgh district of the Scottish Region, are similar to those already in operation in other areas.

Metropolitan-Cammell Carriage & Wagon Co. Ltd. has received a repeat order for 450 30-ton bogie covered goods wagons for the Sudan Railways. A contract for 400 similar wagons was received in December last, making a total of 850, deliveries of which will commence in March, 1958.

British Railways, London Midland Region, have placed a contract with Westinghouse Brake & Signal Co. Ltd. for the supply and installation of 22 double-rail and 36 single-rail Westatic track circuits on the section from Wilmslow to Slade Lane Junction on the Crewe to Manchester line.

British Railways, London Midland Region, have placed the following contracts:—

L. Fairclough Limited, Adlington, Lancs: for new bridge for the Staffordshire County Council, Stone-Rugeley Road A.51, Macclesfield and Colwich lines; reconstruction and widening of spans 1 and 2 of bridge No. 3 carrying Bankhall Street over the railway at Bankhall Station, Liverpool and Southport line; and construction of new railway bridge over North-South Motorway, Preston by-pass, Ribbleton, for Ministry of Transport, Preston and Longridge line

R. Skevington & Sons, Derby: labour only for cleaning and painting, Holyhead Passenger Station

Arundel Painting Contracts & Co. Ltd., Lough, Lincs: labour only for cleaning and painting Braunstone Gate Goods Depot, Leicester, and bridges between Ilkeston North and Derby Friargate, Derby North District

Henry Hope & Sons Ltd., Smethwick, Birmingham: for patent glazing, renewal of roof covering over Fish Dock and Platform 11, New Street Station, Birmingham

W. Latimer & Co. Ltd., Newcastle-on-Tyne 2: labour only for cleaning and painting Mitre Bridge Carriage Shed, Willesden

Arundel (Contractors) Limited, Bradford: labour only for cleaning and painting Blackpool North Passenger Station

Industrial Engineering Limited, London, W.1: labour only for cleaning and painting roof over platforms 7-11, Lime Street Station, Liverpool.

The British Transport Commission, South Wales Docks, has placed the following contracts:—

Fairfield Shipbuilding & Engineering Co. Ltd.: supply and erection of pair of spare inner gates, Port Talbot Docks

Aberdare Cables Limited: supply, delivery and installation of cables for the extension of 11-kV ring main to Talbot Wharf extension, Port Talbot Docks

Walsall Electrical Co. Ltd.: provision of crane plugs and sockets, Newport Docks

W. T. Henleys Telegraph Works Co. Ltd.: supply and delivery of L.T. cable for new cranage facilities, No. 6 section, South Quay, Newport Docks.

The Special Register Information Service, Export Services Branch, Board of Trade, has received a call from Australia for the supply and delivery f.o.b. port of shipment (in sterling or Australian currency) or alternatively f.o.r. in Western Australia, of (*a*) 10 railcar bodies and underframes, and (*b*) 10 sets of railcar power and underfloor equipment.

The issuing authority is the Western Australian Government Tender Board. The tender Nos. are (*a*) 89A 1957, and (*b*) 91A 1957. Bids should be sent to the Western Australian Government Tender Board, 74 Murray Street, Perth. The closing date is March 28, 1957. A copy of the tender documents, including specifications, is available for loan to United Kingdom firms on application to the Branch (Lacon House, Theobalds Road, W.C.1.). The reference (*a*) ESB 5225/57 and (*b*) ESB 5226/57 should be quoted in any correspondence with the Branch.

The Special Register Information Service, Export Services Branch, Board of Trade, reports that the Controller of Stores, Sudan Railways, Atbara, invites tenders for the supply of (*a*) 220,000 hardwood sleepers 6 ft. 6 in. × 9 in. × 5 in., and (*b*) rails and other items of permanent way materials, details of which can be obtained from the Office of Controller of Stores on application.

The closing dates are (*a*) March 25, 1957, and (*b*) March 20, 1957. No further information about this call for tenders is available at the Branch (Lacon House, Theobalds Road, W.C.1.). The reference (*a*) ESB/5019/57, and (*b*) ESB/5291/57, should be quoted in any correspondence with the Branch.

The Special Register Information Service, Export Services Branch, Board of Trade, has received a call from India for railway mechanical signals, as follows:—

226 signal posts (lattice type) 25 ft. ARL, complete with ladders

35 signal posts (lattice type) 30 ft. ARL, complete with ladders

265 signal posts (lattice type) 35 ft. ARL, complete with ladders

76 two doll bracket signals complete with lattice main post, ladder and dolls 5 ft. 8¼ in. and 8 ft. 1¼ in. clear height, complete with ladders

132 three doll bracket signals complete with lattice main post, ladders and two dolls 5 ft. 8¼ in. clear height and main doll 8 ft. 1¼ in. clear in the centre, complete with ladders

8 four doll bracket signals complete with lattice main post, ladder and three dolls 5 ft. 8¼ in. clear height and main doll 8 ft. 8¼ in. clear height, complete with ladders

60 tubular signal posts 28 ft. ARL, complete with ladders.

The issuing authority is the Director General of Supplies and Disposals. The tender number is SRIA/18893-G/V(C). Bids should be sent to the Director General of Supplies and Disposals, Shahjahan Road, New Delhi. The closing date is March 26, 1957. A set of tender documents but not drawings or specifications is available for loan to United Kingdom firms on application to the Branch (Lacon House, Theobalds Road, W.C.1). A photo-copy set can be purchased from the Branch for 17s. Cheques and postal orders should be made payable to the Principal Accountant, Board of Trade. Firms wishing to collect photo-copy sets of tender documents are advised to notify the Branch in advance of their requirements. The reference ESB/5078/57 should be quoted in any correspondence with the Branch.

The Special Register Information Service, Export Services Branch, Board of Trade, has received a call from India for railway mechanical signals as follows:—

300 tubular signals, one-arm, type "A." 22 ft. complete except arm and roundel

Alternatively

signal, one-arm, type "A" lattice, 22 ft., complete except arm and roundel

134 tubular signals, one-arm, type "A," 28 ft. complete with all parts except arm and roundel

Alternatively

signal, one-arm, type "A" (compound channel), 28 ft. complete except arm and roundel

48 tubular signals, one-arm, type "A," 31 ft. complete

Alternatively

signal, one-arm, type "A" (compound channel), 31 ft. complete except arm and roundel

51 tubular signals, one-arm, type "A," 36 ft. complete except arm and roundel

Alternatively

signal, one-arm, type "A" (compound channel), 36 ft. complete except arm and roundel

102 tubular signals, two-arm, 36 ft. (outer warner) type "A," complete except arms and roundels

Alternatively

signal, two-arm, 36 ft. (outer warner) type "A" lattice, complete except arms and roundels.

The issuing authority is the Director General of Supplies and Disposals. The tender No. is SRIA/18794-G/V(C). Bids should be sent to the Director General of Supplies and Disposals, Shahjahan Road, New Delhi. The closing date is March 27, 1957. A set of tender documents is available for loan to United Kingdom firms on application to the Branch (Lacon House, Theobalds Road, W.C.1.). A photo-copy set can be purchased from the Branch for 18s. Cheques and postal orders should be made payable to the Principal Accountant, Board of Trade. Firms wishing to collect photo-copy sets of tender documents are advised to notify the Branch in advance of their requirements. The reference E.S.B./5079/57 should be quoted in any correspondence with the Branch.

The Special Register Information Service, Export Services Branch, Board of Trade, has received a call from India for copper plates as follows:—

8 copper tube plates, unflanged for LM class to drg. No. 3EH(D.G.S. & D. No. 7797) fig. 4 and to I.R.S. specn. No. R-4/5 (EAI/250/2(J) 334 (BK/V))

15 copper firebox plates, 8 ft. × 4 ft. × ½ in. thick and to I.R.S. specn. No. R-4/50. (EAI/261/5)

1 copper back plate, for JE class to drg. No. BJ/T-69 (D.G.S. & D. No. 13359) and to I.R.S. specn. No. R-4/50. (EAI/251/IE)

2 copper back plates for M. & P classes superheated, drg. No. BJ/T-74 (D.G.S. & D. No. 12171) and to I.R.S. specn. No. R-4/50 (EAI/251/4E)

3 copper firebox plates, back duly cut as per true plate for LM class as per drg. No. 3 EH (D.G.S. & D. No. 7797) fig. 11 and to I.R.S. specn. No. R-4/56. (EAI/NR—part No. 364)

The issuing authority is the Director General of Supplies and Disposals. The

tender No. is P/SNI/16810-G/164/IV-56. Bids should be sent to the Director General of Supplies and Disposals, Shahajahan Road, New Delhi. The closing date is March 29, 1957. A set of tender documents but not specifications and drawings is available for loan to United Kingdom firms on application to the Branch (Lacon House, Theobalds Road, W.C.1.). A photo-copy set can be purchased from the Branch for 12s. Cheques and postal orders should be made payable to the Principal Accountant, Board of Trade. Firms wishing to collect photo-copy sets of tender documents are advised to notify the Branch in advance of their requirements. The reference E.S.B. 5482/57 should be quoted in any correspondence with the Branch.

Staff and Labour Matters

Shipbuilding Dispute

The claim of the C.S.E.U. for a 10 per cent increase in the rates of pay of shipbuilding workers has been declined by the Employers' Federation, and in consequence the Confederation, as we went to press, had called an official strike of shipbuilding workers as from noon tomorrow (Saturday) though arbitration was being considered.

A parallel claim for engineering workers was declined on March 12 by the engineering employers, and the C.S.E.U. in consequence decided on strike action.

The C.S.E.U. and the N.U.R. are represented on the Railway Shopmens National Council, the employees' side of which latter body has submitted a claim for a 10 per cent increase; this claim is still under consideration.

Questions in Parliament

London Airport Rail Link

Lt.-Colonel Bromley-Davenport (Knutsford—C.) asked the Minister of Transport & Civil Aviation on March 4, in view of the very large numbers of passengers he expects to use London Airport within 10 years, what steps he was taking to ensure that adequate communication would be provided between the airport and the Metropolis.

Mr. Harold Watkinson, in a written reply: The Cromwell Road Extension, when completed, will, in conjunction with the new air terminal at the Cromwell Curve, reduce the coach travelling time between London Airport and the town terminal to an estimated 30-35 min., as compared with the present 55-60 min.

Other road improvements, he explained, were in preparation. The B.T.C., having received the survey report of its consulting engineers on the possibilities of a rail link between the centre of London and the airport, expected shortly to inform him of its views. He would then be able to decide on the next steps, taking account of the comparative merits of road improvements and of any other currently available proposals, such as those for a monorail connection with the airport.

Transit of Calves by Rail

Colonel Sir Alan Gomme-Duncan (Perth & E. Perthshire—U.) asked the Minister of Agriculture, Fisheries and Food, on March 4 if he was satisfied with the arrangements made for feeding young calves in transit by rail.

Mr. J. Godber, Parliamentary Secretary: As far as my Rt. Hon. Friend is aware, the arrangements are satisfactory.

Notes and News

Cost Accountant Required.—Applications are invited for the post of cost accountant required by the Nigerian Railway Corporation. See Official Notices on page 324.

Vacancies for Draughtsmen.—Consulting engineers in Westminster require draughtsmen, civil engineering, with experience of railway work. See Official Notices on page 324.

Civil Engineers Required for London Transport.—London Transport require a number of civil engineers in connection with their new works programme. See Official Notices on page 324.

Vacancy for Engineering Assistant.—London Transport require an engineering assistant to carry out design of junction work and re-alignment of tracks on its railway system. See Official Notices on page 324.

Engineers and Draughtsmen Required.—Applications are invited for posts of engineers and draughtsmen, civil engineering, with experience of railway working required for Consulting Engineers' office in Westminster. See Official Notices on page 324.

Muir-Hill Cardinal Hydraulic Loader.—In the reference on page 228 of February 22 issue, to the Muir-Hill Cardinal Loader, manufactured by E. Boydell & Co. Ltd., Manchester, it is regretted that it was termed an overloader; the machine is correctly described as a hydraulic loader.

Improvements at Liverpool James Street Station.—Except for the erection of an illuminated mast sign outside the station at Liverpool James Street, which is to be installed soon, the London Midland Region has now completed the re-signing of the station. Work is proceeding on similar lines at other Mersey Railway stations. James Street Station has been redecorated, the frontage renovated, new fluorescent lighting has been installed and the advertising and direction signs re-arranged. The illustration below shows the appearance of a platform at this station with the new signs, advertising hoardings, and strip lighting.

Thos. Cook & Son Ltd. New Blackpool Office.—Thos. Cook & Son Ltd. has moved to a new office in Blackpool, at 15, Corporation Street. The company is also moving to a new office in Luton on April 1, at 24, Chapel Road. Later in April the company's office will be moved from 14, Oxford Street, to 2, Oxford Street, Manchester.

Railway Attractions at Glasgow Schoolboys' Exhibition.—Opportunities for careers on British Railways are featured at the stand arranged by the Scottish Region at the Schoolboys' and Girls' Exhibition being held at the Kelvin Hall, Glasgow, currently until March 23. Entrance to the stand is through a small booking office equipped with an Ultimatic ticket issuing machine. At miniature marshalling yards, diesel shunting locomotives may be operated by visitors. There is a full-scale replica of the cab of the express locomotive *Duke of Gloucester*, also a model which demonstrates the working of multiple-aspect colour light signals. British Railways staff are in attendance to give advice and help.

Retired Railway Officers' Society.—The annual general meeting of the Retired Railway Officers' Society was held on February 12. Membership of the Society at the end of 1956 stood at 183, an increase of one on the previous year, and another record in the history of the Society. The statement of accounts submitted showed a cash balance of £18 1s. and investments £371 16s. The monthly meetings were well supported with an average attendance of 44. Several interesting talks were given by members, and at the May meeting Mr. J. W. Watkins, then General Manager, London Midland Region (now Member of the British Transport Commission), gave an address on "The Railway Modernisation Programme." Mr. George Morton,

Liverpool James Street Station, Mersey Railway, showing new strip lighting and improved signs and advertising layout

who retired from the post of Chief Financial Officer to British Railways in 1950, was elected President for 1957.

C.N.R. Poster to Attract Emigrants.—The illustration below shows a double royal poster of the Canadian National Railways being displayed in Britain by travel

Canadian National Railways poster, including diesel-hauled express

agents and other Canadian interests. Design and art work are by Miss Kay Stewart of London; the poster was printed by Charles & Read Limited.

N.C.B. Diesel Locomotives.—For the pithead standard-gauge shunting work, the West Midlands Division of the National Coal Board is now taking delivery of six 30-ton 208-b.h.p. diesel-mechanical locomotives from the Stafford works of W. G. Bagnall Limited. A National oil engine is used to drive a four-speed Wilson gearbox giving track speeds of 3·6, 6·3, 9·5, and 15 m.p.h., and a bottom-gear tractive effort of 16,900 lb.

Crewe Pupils and Premiums Dinner.—It is hoped to revive, this year, the Crewe Dinner, of past and present Crewe pupils and premium apprentices. If there is sufficient response to the suggestion, the earliest date for a dinner in London will be during the autumn. Those interested are asked to send a postcard giving their permanent address, and stating whether they will be likely to attend if such a dinner is held, to Mr. Eric A. Robinson, 53, Haymarket, London, S.W.1.

South African Railways Deficit.—Mr. B. J. Schoeman, Minister of Transport, announcing the railway budget, stated that the deficit was £7,500,000, but after certain adjustments he expected to reduce this to £2,900,000, against the budgeted surplus of £800,000. The reasons for the deficit were the opening of the railway between Lourenco Marques and Rhodesia and the fact that extensions of the Union railways were not yet sufficiently advanced to cope with the traffic offered to them. During the coming financial year £6,000,000 out of the £25,000,000 programme to provide more tractive power would be spent. This included 60 steam locomotives, 200 electric locomotives and 135 diesels.

"The Student Prince."—In our report of the Great Western Railway (London) Operatic Society's performance of "The Student Prince," in our last week's issue, we stated that the orchestra was under the direction of Stanley Cheffins, who took over at short notice because of the indisposition of Albert Steward. We regret that this was an error and, in fact, Mr. Steward took over because of the indisposition of Mr. Cheffins.

S.N.C.F. Passenger Train Services Restored.—The French National Railways are restoring as from March 15 the main-line passenger trains suspended last November as an oil fuel economy measure. The Newhaven/Dieppe steamer service is to operate again from April 5. Reference to the restoration of the "Blue Train" and of the "Mistral" beyond Marseilles, has been made in recent issues of this journal.

Railway Students' Association Visit to Redbridge and Southampton.—Through the kindness of Mr. C. P. Hopkins, General Manager, Southern Region, and Sir Robert Letch, General Manager, British Transport Docks Division, it has been arranged for the Railway Students' Association to visit Redbridge Sleeper Depot of the Southern Region, and the new South African Terminal at Southampton Docks, on Saturday, March 30. The party will travel by the 8.30 a.m. train from Waterloo to Southampton Central and thence by local train to Redbridge.

Southern Region Ashford Drivers' Training School.—To meet the growing demand for drivers of electric and diesel-electric trains, a training school has been opened at Ashford, Kent. The building is prefabricated and contains a large classroom, messroom, and a study for the instructional staff. Training commenced on February 4; a series of courses of three weeks' duration has been planned, the present courses being concerned with training drivers in the operation of the new six-coach diesel-electric multiple unit trains, intended for the Hastings services via Tunbridge Wells. Classes will normally consist of 12 drivers from various depots; demonstrational equipment includes models, wall charts, demonstration boards and an epidiascope.

British Industry at the Brussels International Exhibition, 1958.—The 1958 World Exhibition to be held at Brussels from April 17 to October 19, 1958, will be the first major international exhibition since the war and is claimed to be the largest of its kind ever to be held. The site, at the Heysel, on the north western outskirts of Brussels, is of some 500 acres, and it is expected that at least 30 million visitors will attend. The British Section will consist of two pavilions, one, arranged and paid for by the British Government; and a larger British Industries Pavilion, entirely the responsibility of British industry. This second pavilion is being organised by British Overseas Fairs Limited on behalf of the Federation of British Industries. In the British Industries Pavilion the aim is to present a representative picture of British industry; the British Electrical and Allied Manufacturing Industry collective exhibit is expected to be the largest single stand in the pavilion. The Belgian Government, as host, is spending over £80 million on preparing the whole exhibition site and improving access; the British Government, through its Commissioner-General, Sir John Balfour, is taking steps to ensure that the British combined contribution at Brussels will show up well against the competition of the other 50 countries participating.

Improvement of River Trent Navigation.—Sir Brian Robertson, Chairman of the British Transport Commission, announced at Nottingham on March 8, that the B.T.C. had approved a programme of further improvements on the River Trent. The programme forms part of the Commission's development plan for principal inland waterways. The Commission hope it will foster still greater traffic on the Trent; in the last three years carryings on this waterway have averaged nearly 800,000 tons a year. The work now to be undertaken on the Navigation includes bank protection and navigation works, mechanisation of lock gates and sluices, and dredging and other plant.

Permali Limited at the Electrical Engineers Exhibition.—A cinema will occupy a large portion of the Permali Limited stand at the Electrical Engineers Exhibition to be held at Earls Court, London, April 9-13. Various films will be shown throughout the day. Besides three new short-length films dealing separately with the use of Permali insulating materials in the construction of rotating machines, transformers and switchgear, it is hoped also to include films of general interest from other manufacturers. Emphasis will also be placed on Permaglass glass fibre reinforced laminates and exhibits will include end shields, overhead line operating poles, air baffles, coil support rings, and junction boxes, while other exhibits will include staywire insulators, and railway insulating fishplates.

Electrical Engineers (A.S.E.E.) Exhibition.—This year the Electrical Engineers Exhibition at Earls Court, London, S.W., on April 9-13, is of record size, with over 380 exhibitors covering an area of 330,000 sq. ft., and for the first time includes the first floor, where also there is a stand of over 7,000 sq. ft. depicting "training and education in the industry and Government services"; this stand will show apprenticeship training on 13 manufacturers' stands. Also supporting are the Association of Supervising Electrical Engineers, the British Standards Institution, Central Electricity Authority, Electrical Contractors' Association, Electrical Trades Union, Institution of Electrical Engineers, the Illuminating Engineering Society, and other bodies. The Minister of Education, Lord Hailsham, is to open the exhibition at noon on April 9. Every type of electrical and associated equipment will be on show. The exhibition is for the trade, and not open to the public for the five days from 10 a.m. to 7 p.m. except April 10, when it is open until 9 p.m.

Farewell Dinner to Mr. R. G. da Costa.—The staff of the office of the Railway Adviser to the High Commissioner for India gave a farewell dinner on March 9, at 3, South Audley Street, W.1, to Mr. R. G. da Costa, who, as recorded in our January 25 and February 22 issues, has relinquished the post of Railway Adviser to the High Commissioner for India, and sails tomorrow (Saturday) for India. After thanking his hosts and colleagues, and expressing his regret at leaving Britain,

where he had met with such co-operation, Mr. da Costa expressed the hope that the Indian railway mechanical engineers now in Britain and on the Continent of Europe, where they had such great opportunities of observing the latest practices and developments in mechanical engineering, would make themselves masters of special techniques, and so, as specialists, be able to use their knowledge and skill for the benefit of the Indian railways on their return to India. Mr. L. T. Madnani, who has succeeded Mr. da Costa, emphasised his determination to carry out his task to the best of his ability.

Blackman Export Co. Ltd.—As a sequel to the acquisition by Keith Blackman Limited of a controlling interest in the Blackman Export Co. Ltd., 23, Queen Square, London, W.C.1, the latter has, as from February 19, become a wholly-owned subsidiary of Keith Blackman Limited.

New Roof for Lime Street.—Work has begun on the complete renewal of the roof coverings over the main line platforms at Liverpool Lime Street, London Midland Region. This roof, 640 ft. long, with a span of 190 ft., will resemble the present one, except that heavy aluminium bars will be substituted for the present timber bars. The work will take 12 months to complete.

Ransome & Marles Leeds Office.—The Ransome & Marles Bearing Co. Ltd. branch office in Leeds was moved in 1954 to St. Paul's House, St. Paul's Street; this necessitated a change in telephone numbers and customers were notified by letter and in advertisements. Despite this, the old telephone number is still receiving up to 20 calls a day intended for the firm. The company draws attention to the fact that its branch office is no longer at Norwich Union Buildings, Leeds, and that the telephone number is now 32094/5 and not 27133.

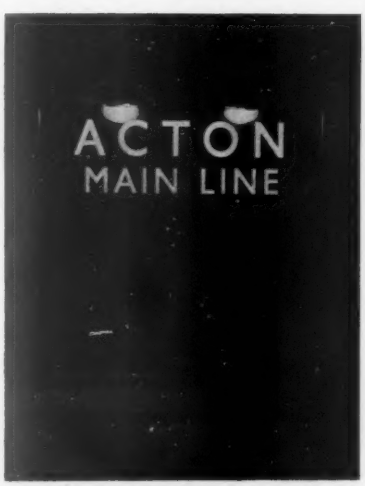
World Congress on Scientific Management.—The Eleventh International Management Congress will be held in Paris on June 24-28 by the International Committee for Scientific Management, the international management organisation represented in Britain by the British Institute of Management. The theme will be "Concrete achievements in the field of scientific management and future prospects in the light of technical and social developments." Administration will be in the hands of the Comité National de l'Organisation Française as management institute of the host country. The congress will be opened on the afternoon of June 24 by the President of the French National Railways, Monsieur Louis Armand, who will speak on "The methods of scientific management in the planning of future trends."

New Staff Amenities Building at Immingham M.P. Depot.—A new staff amenities block is to be built at Immingham Motive Power Depot, Eastern Region, which will provide much improved accommodation for the 600 staff employed. The new block is to be flat roofed with walls of brick and tiled panels, incorporating large glazed areas for maximum natural lighting. Accommodation will include two messrooms each with seating and tables for 140 persons to eat at one sitting. A thermostatically controlled boiler will provide a constant hot water supply to the kitchen and washroom equipped with two washing fountains, five washbasins, and three deep sinks. The amenities block will also have 622 independent lockers, drying room, and cloakroom. Because of the poor nature of the subsoil, the building will be constructed on a foundation of concrete piles and ground beams and will have a concrete frame. The flat roof is to be of precast concrete roof decking units and ventilated, domed glass roof lights are to be fitted over the internally sited kitchen and washroom. The new block was designed by Mr. H. H. Powell, Eastern Region Architect, under the general direction of Mr. A. K. Terris, Chief Civil Engineer, and the initial contract for the foundation piling work has been let to Holmpress Piles Limited, of Hull.

I.E.A. Exhibition to be Repeated in 1958.—The large number of potential exhibitors, and the interest shown by the industry in the first Instruments, Electronics & Automation Exhibition, to be held at Olympia, London, in May of this year, has resulted in a decision to stage the show again next year. The dates will be April 16-25, 1958, at Olympia.

British Electrical Power Convention.—"Electricity in the national economy," has been chosen as the theme of the ninth British Electrical Power Convention which is to be held this year at Eastbourne from June 17 to 21. The Convention is under the Presidency of Sir Josiah Eccles, Deputy Chairman (Operations) of the Central Electricity Authority. The annual dinner will be held at the Grand Hotel on June 20, and this will be followed by a dance at the Winter Garden. The concluding session takes place on the morning of June 21, with the Electrical Forum, in which a team answers questions on electrical matters. This is followed by the annual general meeting.

New Type of Illuminated Station Name Sign.—To overcome the problem of illuminating large station name signs at the extreme incoming ends of platforms, the Western Region, in co-operation with Mead McLean & Co. Ltd., Brockley, S.E.4, has recently produced and installed at Acton Main Line station an Eroline sign, the lighting fittings of which are an integral part of the structure. In this new type of sign illustrated below the conduit supporting arms for the two twin-set lamps are connected to the supply leads through the sign and down through one of the tubular steel uprights, thus giving a neat and compact appearance.



New type of illuminated name sign at Acton Main Line

Sellafield Station to be Rebuilt.—Work has begun on the rebuilding of Sellafield Station, Cumberland, on the former Furness Railway (now London Midland Region) between Barrow and Whitehaven. Since the installation of the nearby new atomic power station at Calder Hall passenger traffic has grown to over 35,000 a year. The re-building scheme includes a new waiting room and other station buildings and, because of the exposed position, a concrete awning and glass protection screen.

New Platform Awning and Lighting at Ipswich.—An awning type roof over the up platform is being built and new cold cathode electric lighting installed by the Eastern Region at Ipswich Station. The platform roof is of glass and asbestos cement decking, supported on steel stanchions and cross members. Demolition of the existing roof over the up platform is being carried out in sections about 120 ft. long, except for a length of some 80 ft. by the booking hall where interference with passenger movement must be kept to a minimum. Replacement of each section of roofing by the new awning will be completed as far as possible before work begins on the adjoining section. Temporary cover is to be provided for all doorways of the platform buildings and temporary electric lighting installed as the existing gas lighting is removed. When the roofing is completed cold cathode electric lighting will be installed in place of the temporary lighting. The station name is incorporated in the mask of the fitting making station identification easy for passengers by day or night. The new awning for the up platform at Ipswich was designed and is being erected under the general direction of Mr. A. K. Terris, Chief Civil Engineer, Eastern Region, and the contractors for the reconstruction are Sadler & Sons of Richmond Road, Ipswich.

Forthcoming Meetings

Open currently and until further notice.—**British Transport Commission: Historical Exhibition "Transport Treasures" in Shareholders' Meeting Room, Euston Station, from 10 a.m. to 6 p.m. on weekdays, and 2 to 6 p.m. on Sundays. Admission 6d.**

March 19 (*Tue*).—Institution of Railway Signal Engineers, London Section, at the Institution of Electrical Engineers, Savoy Place, London, W.C.2, at 6 p.m. Paper on "Automatic operation of marshalling yards," by Mr. D. C. Webb.

March 20 (*Wed.*).—Permanent Way Institution, London Section, at the Headquarters of the British Transport Commission, 222, Marylebone Road, London, N.W.1, at 6.30 p.m. Paper (illustrated) on "Effect of new forms of motive power on the permanent way—the mechanical engineer's point of view," by Mr. E. S. Cox, President-Elect, Institution of Locomotive Engineers.

March 20 (*Wed.*).—Institute of Traffic Administration, Bristol Centre, at the Grand Hotel, Bristol, at 7.30 p.m. Paper on "Railway motive power," by Mr. D. C. Reynolds.

March 20 (*Wed.*).—Railway Students' Asso-

ciation, at the London School of Economics & Political Science, Houghton Street, London, W.C.2, at 6.15 p.m. Paper on "Work study within the British Transport Commission," by Mr. E. J. Larkin, Director of Work Study, British Transport Commission, Sir J. Landale Train will be in the Chair.

March 20 (*Wed.*).—Institution of Locomotive Engineers, at the Institution of Mechanical Engineers, 1, Birdcage Walk, London, S.W.1., at 5.30 p.m. Forty-sixth annual general meeting, followed by paper on "Unification of freight vehicles on oversea railways," by Mr. A. Campbell, Past-President.

March 21 (*Thu.*).—British Railways, Western Region London Lecture & Debating Society, in the Headquarters Staff Dining Club, Bishop's Bridge Road, Paddington, W.2, at 5.45 p.m. Paper on "Oil—From prospector to user," illustrated by lantern slides, by Mr. J. D. Pull, Chief Engineer, Shell Refinery, Stanlow, preceded by annual general meeting.

March 21 (*Thu.*).—Model Railway Club, at Caxton Hall, Westminster, S.W.1, at 7.45 p.m. Talk on "Modelling the Furness Railway," by Mr. Ross D. Pochin.

March 22 (*Fri.*).—R.O.D. Officers' Reunion Dinner, at the Transportation Club, 44, Wilton Crescent, London, S.W.1., at 6.30 for 7 p.m.

March 25 (*Mon.*).—Stephenson Locomotive Society, Midland Area, at the Birmingham Exchange & Engineering Centre, at 7.15 p.m. Display of members' colour slides. "Coventry challenges Birmingham."

March 26 (*Tues.*).—Institute of Transport, Leeds & District Graduate & Student Society, at the Leeds City Transport Department, 1, Swinegate, Leeds, 1, at 7 p.m. Paper on "Transport section of the National Coal Board," by Mr. F. Stokes, Area Transport Officer, National Coal Board.

March 26 (*Tue.*).—Railway Correspondence & Travel Society, East Midlands Branch, at the N.C.S. Guild Room, Toll Street, Nottingham, at 7.15 p.m. Paper on "The Ambergate, Nottingham, Boston & Eastern Junction Railways," by Mr. C. R. Clinker.

March 27 (*Wed.*).—Institution of Mechanical Engineers, at 1, Birdcage Walk, Westminster, London, S.W.1, at 6.45 p.m. Internal Combustion Engine Group Discussion: "Are we satisfied with the progress of the diesel for future development?"

March 29 (*Fri.*).—Institution of Railway Signal Engineers, Bristol Section, in the Meeting Room above Main Booking Hall, Temple Meads Station, at 5.30 p.m. Paper on "Testing of signalling installations," by Mr. W. J. Claridge.

March 29 (*Fri.*).—British Railways, Western Region, London Lecture & Debating Society. Debate with Federation of Railway Lecture & Debating Societies at York.

March 30 (*Sat.*).—Railway Travel & Correspondence Society, Sussex & Kent Branch, at the Railway Hotel, Brighton, at 7 p.m. Speaker: Mr. W. C. Collins, District Traffic Superintendent, Redhill.

March 30 (*Sat.*).—Railway Travel & Correspondence Society, South of England Branch, at the M.P.D. Social Hall, Eastleigh, at 6.30 p.m. Paper on "Railway experiences on and off the footplate," by Mr. R. N. Hardy.

March 30 (*Sat.*).—Stephenson Locomotive Society. Visits to Brighton Locomotive Works, Running Shed and Signalbox, from 3 p.m.

Railway Stock Market

The shipbuilding strike threat, reports of coming labour troubles in other industries as well, and a tendency to await developments in the Middle East combined to upset sentiment in stock markets. Prices in all sections reacted sharply, but there was a partial rally later. British Funds were not immune from the reaction because they were affected by less talk in the City of an impending reduction in the Bank Rate. Moreover, opinions are divided whether the Budget can be expected to bring major tax cuts, though there are widespread hopes of concessions of some kind.

Foreign rails developed no particular feature and generally held steady, though Antofagasta ordinary stock was less active and eased to 30¾, which compares with 32 a week ago. The 5 per cent preference stock came back from 46¼ to 45, despite the attractive yield. It can be argued that either the preference stock is too low or the ordinary stock too high, because a bigger dividend on the ordinary seems improbable this year. Although no development of the kind has ever been indicated officially as likely, if there were a takeover or a nationalisation move, ordinary stockholders would expect to receive well over the current level of their stock, which is much below its break-up value.

Costa Rica ordinary stock has been steady at 24½. Guayaquil & Quito first debentures were 92, and International of Central America shares held at $37½. Mexican Central "A" bearer debentures kept their recent improvement to 70¼ and the quotation for Dorada ordinary stock remained at 52½. Chilean Northern 5 per cent debentures at 44¼ held the same level as a week ago. Taltal Railway shares were again quoted at 11s. 6d.

United of Havana second income stock kept at 8 and the consolidated stock was 2¼. San Paulo Railway 3s. ordinary units changed hands around par.

There was again a fair amount of activity in White Pass shares, which, however, after being dealt in up to $23¼, eased to $22⅝, compared with $21¼ a week ago. Canadian Pacifics strengthened slightly from $60¼ to $60¾, but the preference stock came back from £62¾ to £62, and the 4 per cent debentures from £72¼ a week ago to £71.

Engineering and kindred shares were affected by the shipbuilding strike threat and also by the fact that main attention in stock markets this week has been concentrated on Steel Company of Wales offer of 40,000,000 shares at £1 each. Share prices eased with the general trend, but this has been due more to caution by buyers than to selling. Westinghouse Brake came back from 81s. 6d. to 80s.

The quotation for G. D. Peters shares kept at 33s. 9d. British Wagon £5 paid shares were £16¼ and the £1 shares 65s. 6d., while on balance, Central Wagon shares have moved up from 19s. to 20s. Gloucester Wagon 10s. shares remained at 14s. and Wagon Repairs 5s. shares at 13s. 3d., but Charles Roberts 5s. shares eased from 13s. 3d. to 12s.

Beyer Peacock came back from 45s. 3d. to 44s. and Birmingham Wagon shares from 22s. 7½d. to 21s. 9d. Hurst Nelson were 36s. 6d. and North British Locomotive 13s. 7½d.

OFFICIAL NOTICES

ENGINEERS and DRAUGHTSMEN, Civil Engineering, with experience of railway work, wanted for Consulting Engineers, Westminster office. Pension Scheme. 5-day week. Luncheon and sports clubs. Apply, with full particulars of age and experience, to Rendel, Palmer & Tritton, 125, Victoria Street, Westminster, S.W.1.

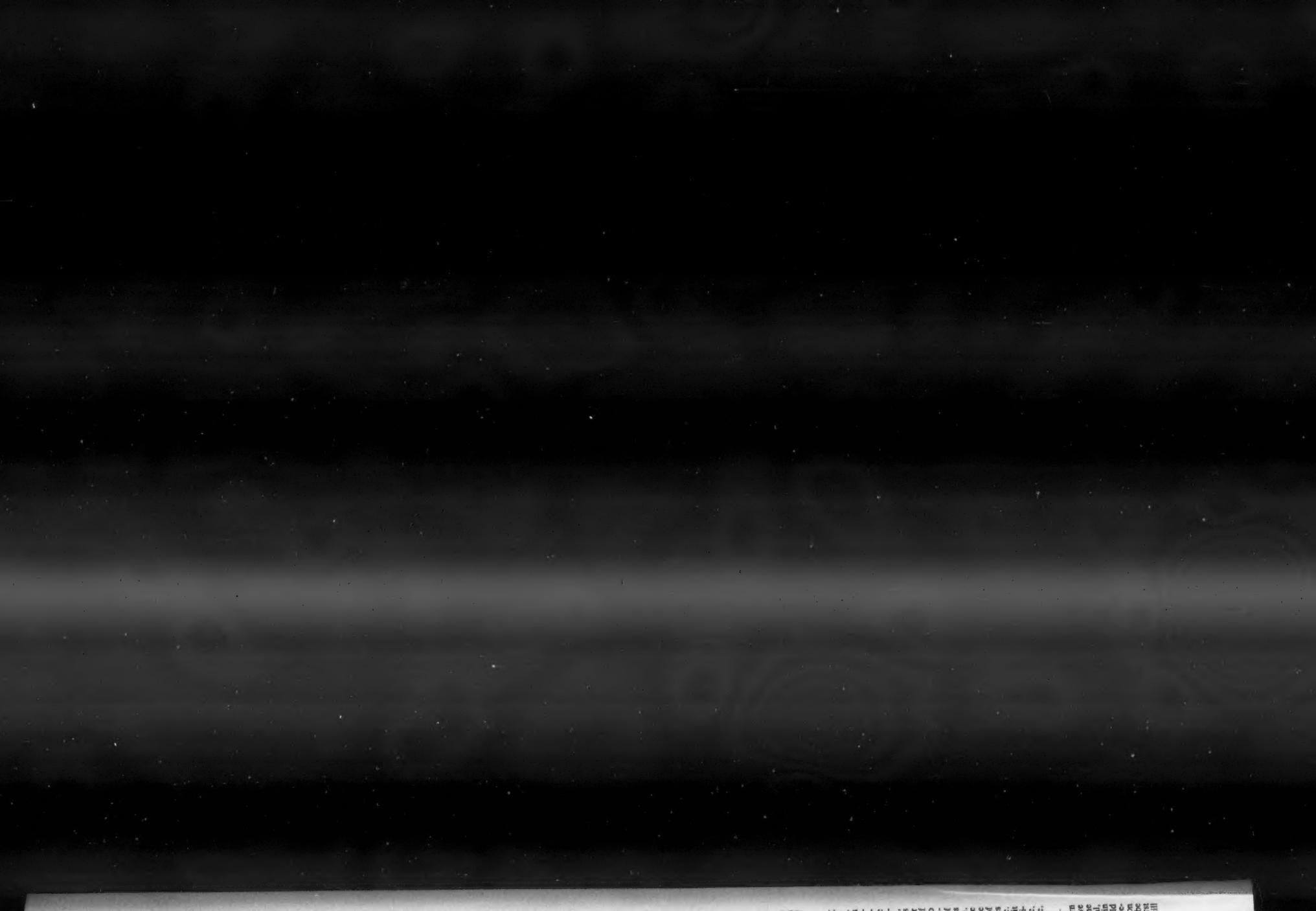
DRAUGHTSMEN, Civil Engineering, with experience of railway work, wanted for Consulting Engineers' Office in Westminster. 5-day week. Contributory Pension Scheme. Progressive position. Apply with full particulars of age and experience to Box No. 754, c/o Charles Barker & Sons, Ltd., Gateway House, London, E.C.4.

SALES and SERVICE ENGINEER with Railway background required to set up a new department to deal with sales of Roller Bearing Axle Boxes of established reputation. Applicants should submit full details of their education and previous Railway background. Box 264, *The Railway Gazette*, 33, Tothill Street, London, S.W.1.

LONDON TRANSPORT require ENGINEERING ASSISTANT to carry out design of junction work and re-alignment of tracks on London Transport's railway system. Qualifications: good knowledge of design or point and crossing work; ability to prepare permanent way schemes for new works and improvements; Ordinary National Certificate in engineering or equivalent. Salary range £750—£840. Free travel. Applications within 14 days to Recruitment and Training Officer (F/EV 616), 55, Broadway, S.W.1.

LONDON TRANSPORT require a number of CIVIL ENGINEERS in connection with their New Works Programme; preferably with a University Degree or Graduate Membership of a recognised professional Institution. Applicants must have had experience in preparation of schemes, estimates, civil engineering design, contract drawings and documents, and be capable of controlling staff and supervising works executed by contract. They must have had experience in some of the following types of civil engineering work—earthworks, drainage, bridging, retaining walls, heavy foundations, R.C. works, tunnelling, general railway construction. Salary range according to ability, qualifications and experience, from £750 to £1,100. Medical examination; free travel. Applications within 14 days to Recruitment and Training Officer (F/EV626), London Transport, 55, Broadway, S.W.1.

THE River Wear Commissioners Port of Sunderland.—Applications are invited for the post of GENERAL MANAGER and CLERK to The River Wear Commissioners at Sunderland. The salary will depend upon the qualifications and experience of the successful applicant, but will not be less than £2,250 per annum. The post is a designated post under the Local Government Superannuation Acts. The appointment entails responsibility to the Commissioners for the general administration of their Undertaking, and the working of the Port including management of the Sunderland Corporation Quay. Experience in the commercial field of Port activities is essential and experience in Trust Operated Ports would be an advantage. Applications giving full details of age, education, qualifications, experience, and positions held should be sent, not later than 31st March, 1957, under confidential cover addressed to The Chairman, River Wear Commissioners, St. Thomas Street, Sunderland, marking the envelope "General Manager."

THE Nigerian Railway Corporation invites applications for appointment as ACCOUNTANT (COST). Salary: £800×£50—£1,600, plus £300 p.a. overseas pay. Commencing salary will depend upon qualifications and experience. Qualifications: Candidates should hold a recognised accounting qualification with not less than 5 years' practical experience since qualifying, or should have passed the Intermediate Examination of a recognised accounting body, with 10 years' accounting experience. Candidates will be required to introduce a procedure for budgetary control of the recurrent expenditure of the Operating Department Running Shed costs and to simplify pay procedure. Appointments on pensionable terms, or on contract carrying a gratuity of 20 per cent of total emoluments per annum. Terms of service provide for tours of 15 months each, 7 days' full pay leave per month of service, free passages for officer and wife, and separate domicile allowance £75 p.a. each in respect of maximum of two children while in U.K., or cost of their passages to and from Nigeria, if under 18 years of age. Part furnished quarters provided at low rental. Outfit allowance £60, payable on first appointment. Applications to be addressed to the London Representative, Nigerian Railway Corporation, 11, Manchester Square, London, W.1.

AN old established Company with modern Engineering Factories, supported by extensive Foundry capacity, is seeking new ideas, or the more efficient application of old ideas, in mechanical, hydraulic or automative engineering, particularly in the form of complete assemblies. Design should be covered by patents wherever possible, and preferably from individual designers seeking production facilities. Replies to this advertisement must be from principals only and should be sent in the first place to Box 266, *The Railway Gazette* 33, Tothill Street, London, S.W.1.